Service Manual

FLO 9 / 12 DCI Series

Indoor Units	Outdoor Units
FLO 9 DCI	GC 9 DCI
FLO 12 DCI	GC 12 DCI





REFRIGERANT

R410A

HEAT PUMP

SM FLODCI 1-A.1 GB

NOVEMBER – 2008

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LIST OF EFFECTIVE PAGES

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*Due to constant improvements please note that the data on this service manual can be modified with out notice.
**Photos are not contractual

Table of Contents

1. INTRODUCTION

1.1 General

The new **FLO DCI** split wall mounted range has expanded, comprising two additional RC (heat pump) models:

- **FLO 9 DCI**
- **FLO 12 DCI**

The indoor **FLO** units are available as LED or LCD display types featuring esthetic design, compact dimensions, and low noise operation.

1.2 Main Features

The **FLO DCI INV** series benefits from the most advanced technological innovations, namely:

- DC inverter technology.
- R410A.
- High COP.
- Lego concept.
- Pre-Charged units up to the max' allowing tubing distance.
- Networking system connectivity.
- A dry contact for clock or power shedding functions (configurable).
- Base heater connection.
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Supports Indoor Air Quality features, such as – Ionizer, Active Electrostatic Filter.
- Indoor large diameter cross flow fan, allowing low noise level operation.
- Bended indoor coil with treated aluminum fins and coating for improved efficiency.
- Easy access to the interconnecting tubing and wiring connections, so that removing the front grill or casing is not necessary.
- Refrigerant pipes can be connected to the indoor unit from 5 different optional directions.
- Water condensate tray is equipped with two optional drain connections.
- Automatic treated air sweep.
- Low indoor and outdoor noise levels.
- Easy installation and service.

1.3 Indoor Unit

The indoor unit is wall mounted, and can be easily fitted to many types of residential and commercials applications.

- **FLO 9, 12**

New design is available in LCD and LED versions.

Old design is available in LED version only.

Indoor Unit features:

Feature	FLO 9, 12
Display	LCD or LED
Ionizer	YES
ESF	YES
Fresh air	Optional
Indoor fan motor	Variable speed (PG)
Horizontal motorized louver	YES
Vertical motorized louver	Optional
Heating element	NO
M2L Cable port	YES
Dry contact	Presence detector or (jumper selected) power shedding

1.4 Filtration

The **FLO DCI Series** presents several types of air filters:

- Easily accessible, and re-usable pre-filters (mesh)
- Pre-charged electrostatic filter (disposable)
- Active carbon filter (disposable)
- ESF. Active Electro Static re-usable filter (optional)

1.5 Ionizer (Optional)

A special design Ionizer protected by unique patents integrated into the indoor unit, generating negative ions to the room providing comfort and upgraded indoor air quality.

1.6 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provide complete operating function and programming.
Remote controllers: RC-2/3/4/5/7, RC-4i-1, RCW, µBMS.
Networking system Airconet version 4.2 and up, MIU SW version H8 and up.
For further details please refer to the Operational Manual, Appendix A.

1.7 Outdoor Unit

The FLO DCI INV outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected by anti- corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information please refer to the Product Data Sheet, Chapter 2.

- **GC 9 DCI**
- **GC 12 DCI**

Outdoor Unit Feature

Feature	GC 9, 12 DCI
Display	3 LED's
Base Heater	Optional
Outdoor Fan	Variable speed DC Inverter
M2L cable Port	No

1.8 Tubing Connections

Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual, Chapter 9.

1.9 Accessories

Item	Description
MIU (FLO)	MODBUS interface unit
MIU (K)	MODBUS interface unit
RS485 Adapter	To be used as an interface with RCW or µBMS remote controllers
Base Heater	
M2L cable Port	

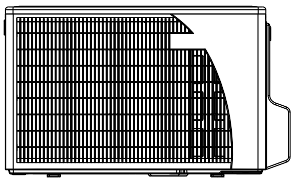
For further details please refer to Optional Accessories, Chapter 17.

1.10 Inbox Documentation

Each unit is supplied with its own installation and operation manuals.

1.11 Matching Table

1.11.1 R410A

	OUTDOOR UNITS		INDOOR UNITS			
						
	MODEL	REFR	FLO 9 DCI	FLO 12 DCI	K 9 DCI	K 12 DCI
	GC 9 DCI	R410A	√		√	
	GC 12 DCI	R410A		√		√

The above table lists outdoor units and FLO indoor units which can be matched together. In addition the listed outdoor units can be matched with other types of indoor units such as cassettes.

For further information please refer to the relevant Service Manual.

2. PRODUCT DATA SHEET

2.1 FLO 9 / GC 9 DCI

Model Indoor Unit				**FLO 9 DCI**	
Model Outdoor Unit				**GC 9 R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	8530(4780-12280)	11600(5120-17060)
			kW	2.5(1.4-3.6)	3.4(1.5-5.0)
Power input (4)			kW	0.595(0.42-1.0)	0.81(0.39-1.6)
EER (Cooling) or COP(Heating) (4)			W/W	4.20	4.20
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	2.7	3.8
Power factor				0.97	0.97
Prated (IDU)			W	32	
Prated (IDU+ODU)			W	1600	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1050/900/800	
	Air flow (1)	H/M/L	m3/hr	530/430/330	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	51/ - /39	
	Sound pressure level(3)	H/M/L	dB(A)	39/ - /26	
	Moisture removal		l/hr	1	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x190	
	Net Weight		kg	10.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	13.5	
	Units per pallet		units	28	
	Stacking height		units	7evels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	61	
	Sound pressure level(3)	H	dB(A)	51	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.1	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Airflow in ducted units;at nominal external static pressure.
(2)Sound power in ducted units is measured at air discharge.
(3)Sound pressure level measured at 1-meter distance from unit.
(4)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).

2.2 FLO 12 / GC 12 DCI

Model Indoor Unit				**FLO 12 DCI**	
Model Outdoor Unit				**GC 12 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	11940(4780-14670)	14670(5100-19790)
			kW	3.5(1.4-4.3)	4.3(1.5-5.8)
Power input (4)			kW	0.99(0.42-1.25)	1.125(0.39-1.75)
EER (Cooling) or COP(Heating) (4)			W/W	3.54	3.82
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	4.6	5.2
Power factor				0.97	0.97
Prated (IDU)			W	40	
Prated (IDU+ODU)			W	1800	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1100/950/800	
	Air flow (1)	H/M/L	m3/hr	550/450/350	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	52/ - /39	
	Sound pressure level(3)	H/M/L	dB(A)	40/ - /26	
	Moisture removal		l/hr	1.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x190	
	Net Weight		kg	10.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	13.5	
	Units per pallet		units	28	
	Stacking height		units	7levels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	62	
	Sound pressure level(3)	H	dB(A)	52	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38.5	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42.5	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.2	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

1)Airflow in ducted units;at nominal external static pressure.
(2)Sound power in ducted units is measured at air discharge.
(3)Sound pressure level measured at 1-meter distance from unit.
(4)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).

3. RATING CONDITIONS

Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).

Cooling:
Indoor: 27°C DB 19°C WB
Outdoor: 35 °C DB

Heating:
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

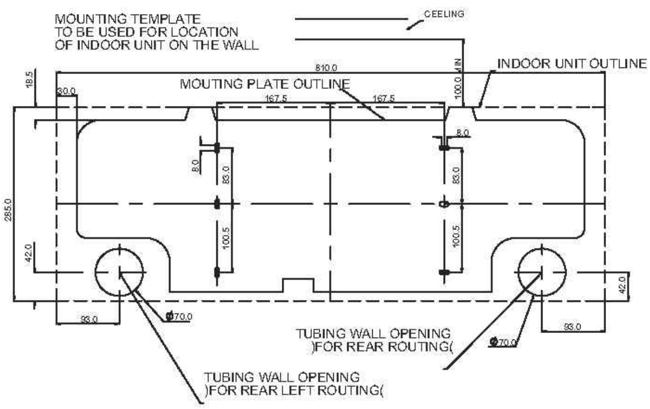
3.1 Operating Limits

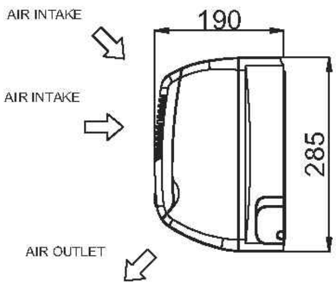
3.1.1 R410A

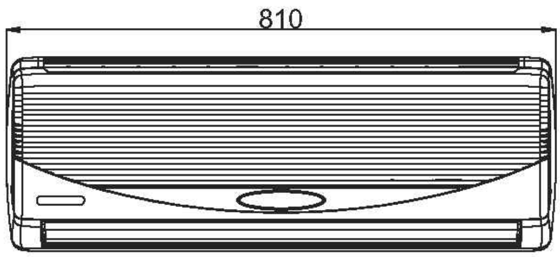
		Indoor	Outdoor
Cooling	**Upper limit**	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	**Upper limit**	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		198 – 264 V	

4. OUTLINE DIMENSIONS

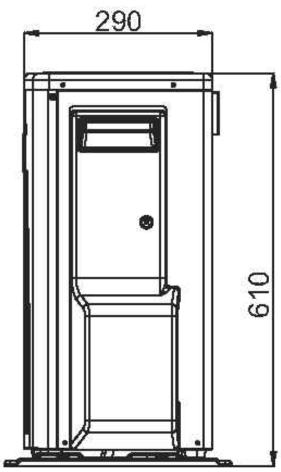
4.1 Indoor Unit: FLO 9 / 12 DCI

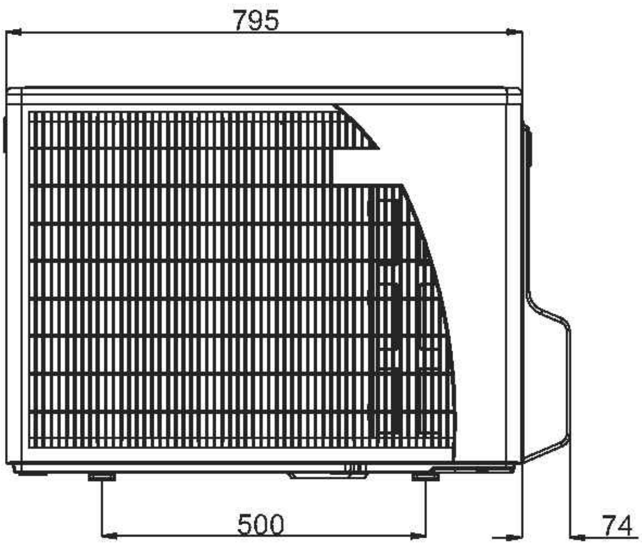


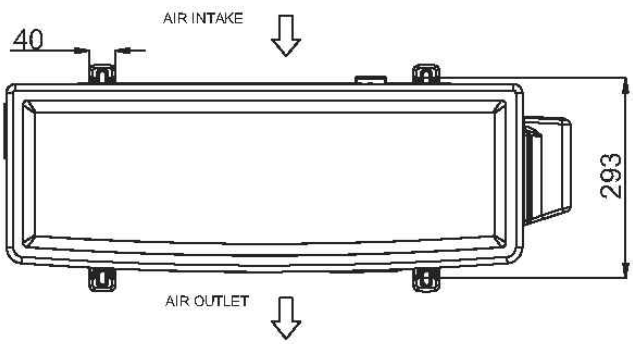




4.2 Outdoor Unit: GC 9 / 12 DCI







5. PERFORMANCE DATA

5.1 FLO 9 DCI

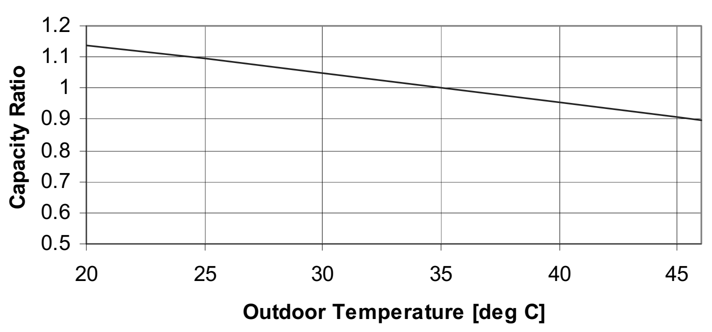
5.1.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [C^0]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	2.42	2.57	2.73	2.89	3.05
	SC	1.64	1.67	1.71	1.74	1.77
	PI	0.47	0.48	0.49	0.49	0.50
30	TC	2.30	2.46	2.62	2.77	2.93
	SC	1.60	1.63	1.67	1.70	1.73
	PI	0.52	0.53	0.54	0.55	0.56
35	TC	2.18	2.34	**2.50**	2.66	2.82
	SC	1.56	1.59	**1.63**	1.66	1.69
	PI	0.58	0.59	**0.60**	0.60	0.61
40	TC	2.07	2.23	2.38	2.54	2.70
	SC	1.52	1.55	1.58	1.62	1.65
	PI	0.63	0.64	0.65	0.66	0.67
46	TC	1.93	2.09	2.24	2.40	2.56
	SC	1.47	1.50	1.53	1.57	1.60
	PI	0.70	0.71	0.72	0.72	0.73

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.1.2 Capacity Correction Factors



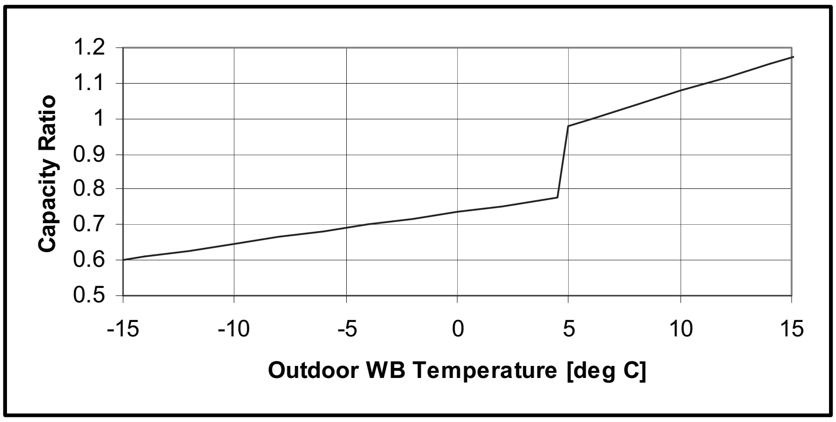
5.1.3 Heating Capacity (kW) - Run Mode)

OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [ºC]		
		15	**20**	**25**
-15/-16	TC	2.16	2.01	1.86
	PI	0.49	0.54	0.58
-10/-12	TC	2.41	2.26	2.11
	PI	0.59	0.64	0.68
-7/-8	TC	2.59	2.44	2.29
	PI	0.66	0.71	0.76
-1/-2	TC	2.68	2.53	2.38
	PI	0.70	0.75	0.80
2/1	TC	2.75	2.59	2.44
	PI	0.72	0.77	0.82
7/6	TC	3.55	**3.40**	3.25
	PI	0.76	**0.81**	0.86
10/9	TC	3.75	3.60	3.44
	PI	0.81	0.86	0.90
15/12	TC	3.94	3.79	3.64
	PI	0.85	0.90	0.95
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

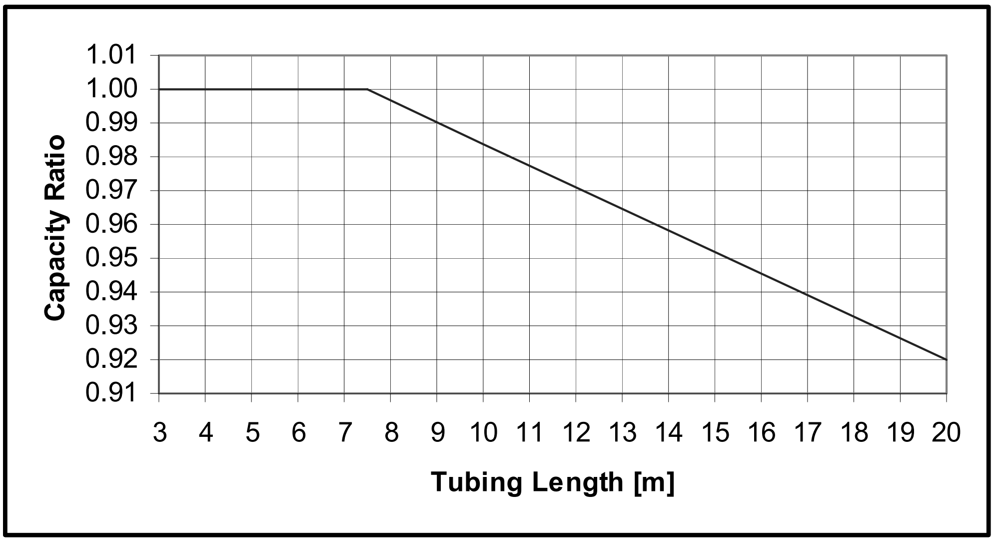
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.1.4 Capacity Correction Factors

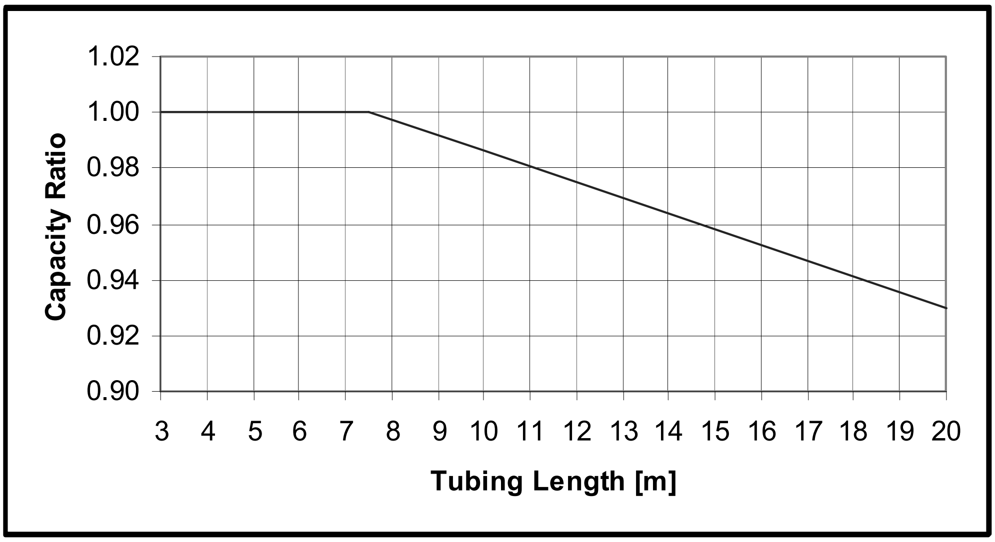


5.2 Capacity Correction Factor Due to Tubing Length

5.2.1 Cooling



5.2.2 Heating



5.3 FLO 12 DCI

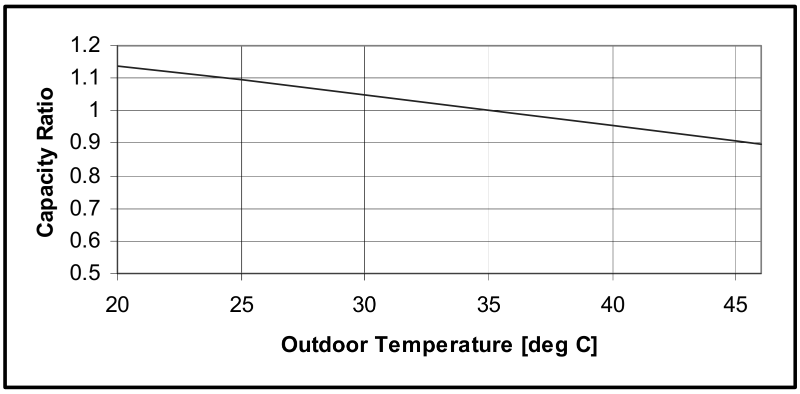
5.3.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	3.38	3.60	3.83	4.05	4.27
	SC	2.40	2.45	2.50	2.55	2.60
	PI	0.78	0.79	0.81	0.82	0.84
30	TC	3.22	3.44	3.66	3.88	4.11
	SC	2.34	2.39	2.44	2.49	2.54
	PI	0.87	0.88	0.90	0.91	0.93
35	TC	3.06	3.28	**3.50**	3.72	3.94
	SC	2.28	2.33	**2.38**	2.43	2.48
	PI	0.96	0.98	**0.99**	1.00	1.02
40	TC	2.89	3.12	3.34	3.56	3.78
	SC	2.22	2.27	2.32	2.37	2.42
	PI	1.05	1.07	1.08	1.10	1.11
46	TC	2.70	2.92	3.14	3.36	3.58
	SC	2.15	2.20	2.25	2.30	2.34
	PI	1.16	1.18	1.19	1.21	1.22

LEGEND

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.3.2 Capacity Correction Factors



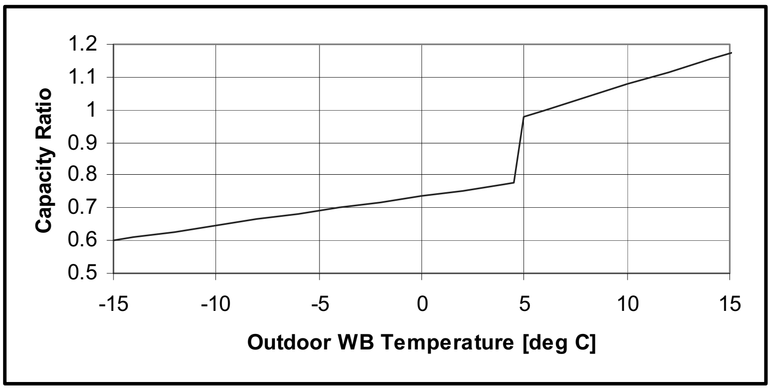
5.3.3 Heating Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [ºC] 15	20	25
-15/-16	TC	2.74	2.55	2.35
	PI	0.68	0.74	0.81
-10/-12	TC	3.05	2.86	2.66
	PI	0.81	0.88	0.95
-7/-8	TC	3.28	3.09	2.90
	PI	0.92	0.99	1.06
-1/-2	TC	3.39	3.20	3.01
	PI	0.97	1.04	1.11
2/1	TC	3.47	3.28	3.09
	PI	1.00	1.07	1.14
7/6	TC	4.49	**4.30**	4.11
	PI	1.06	**1.13**	1.19
10/9	TC	4.74	4.55	4.36
	PI	1.12	1.19	1.26
15/12	TC	4.99	4.80	4.60
	PI	1.18	1.25	1.32
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

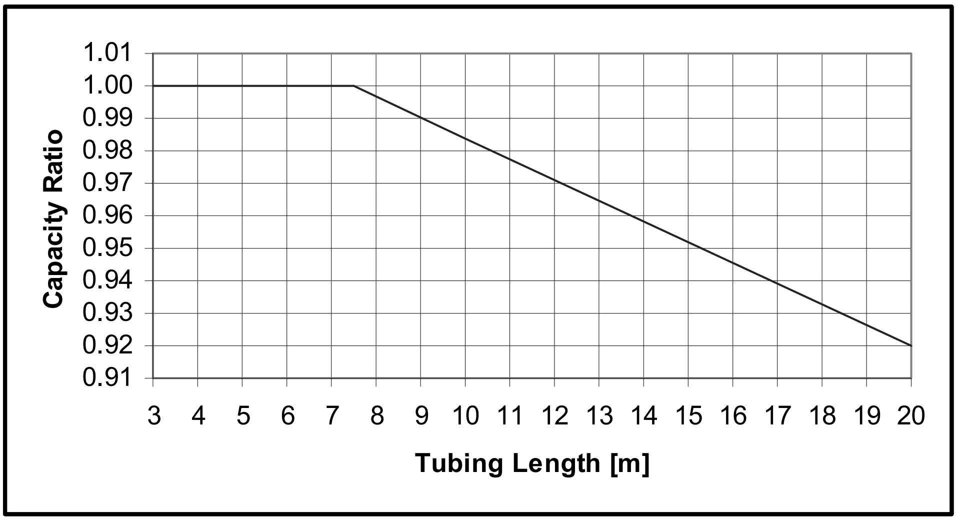
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.3.4 Capacity Correction Factors

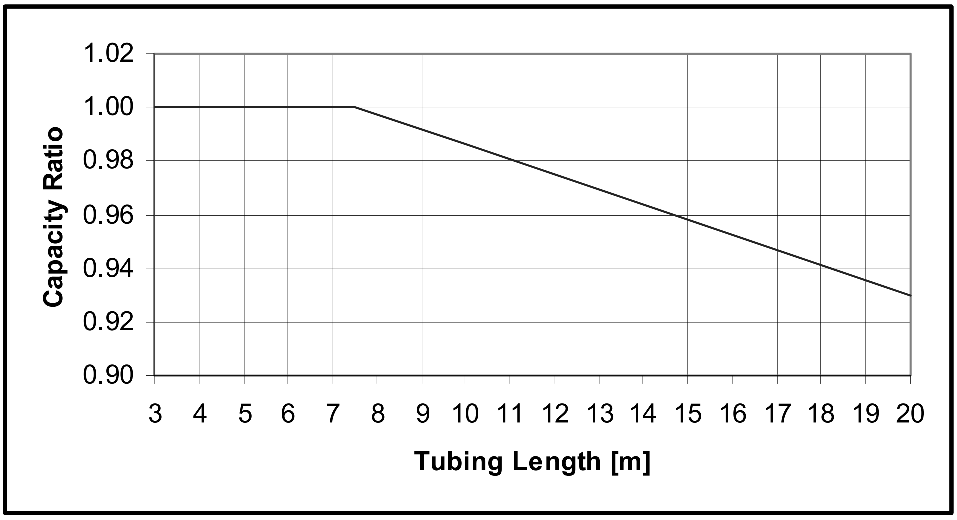


5.4 Capacity Correction Factor Due to TUbing Length

5.4.1 Cooling



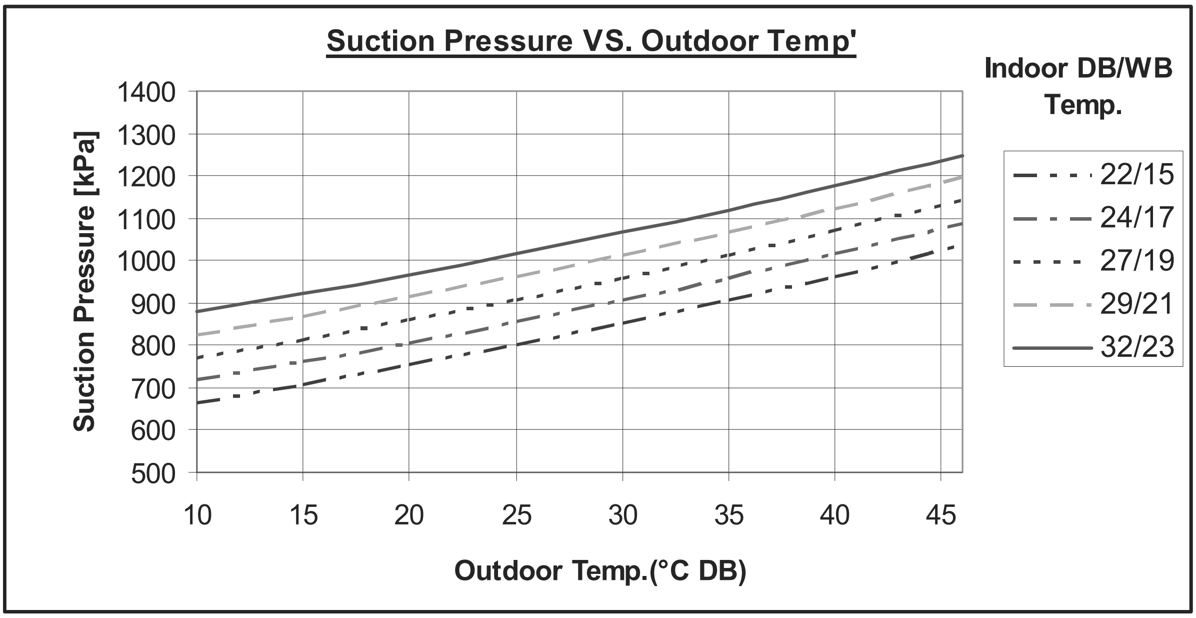
5.4.2 Heating

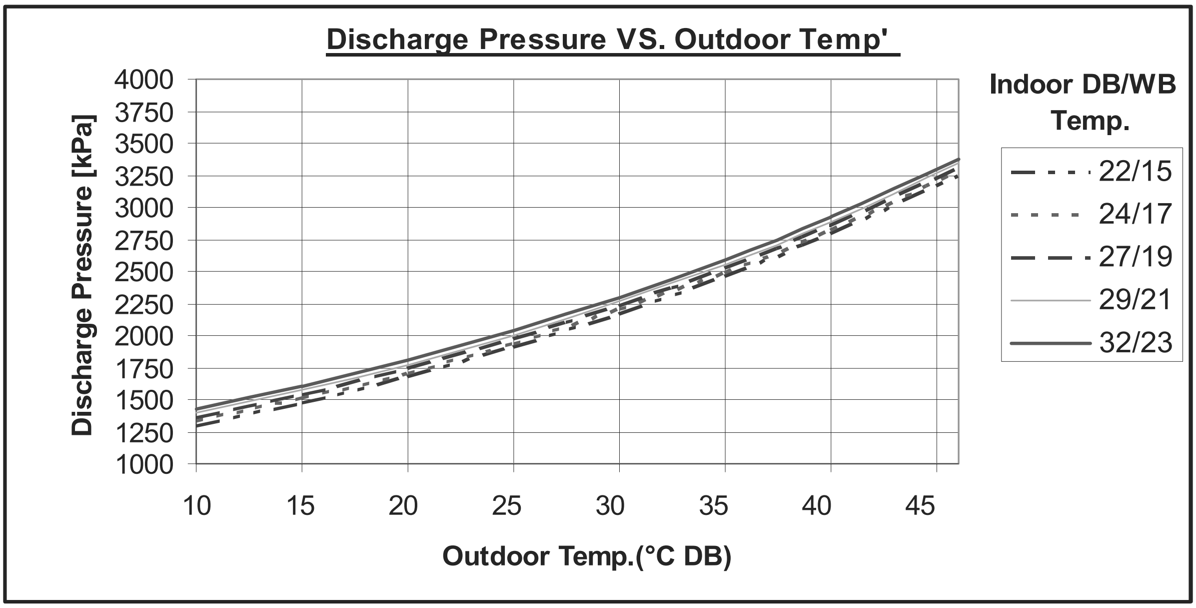


6. PRESSURE CURVES

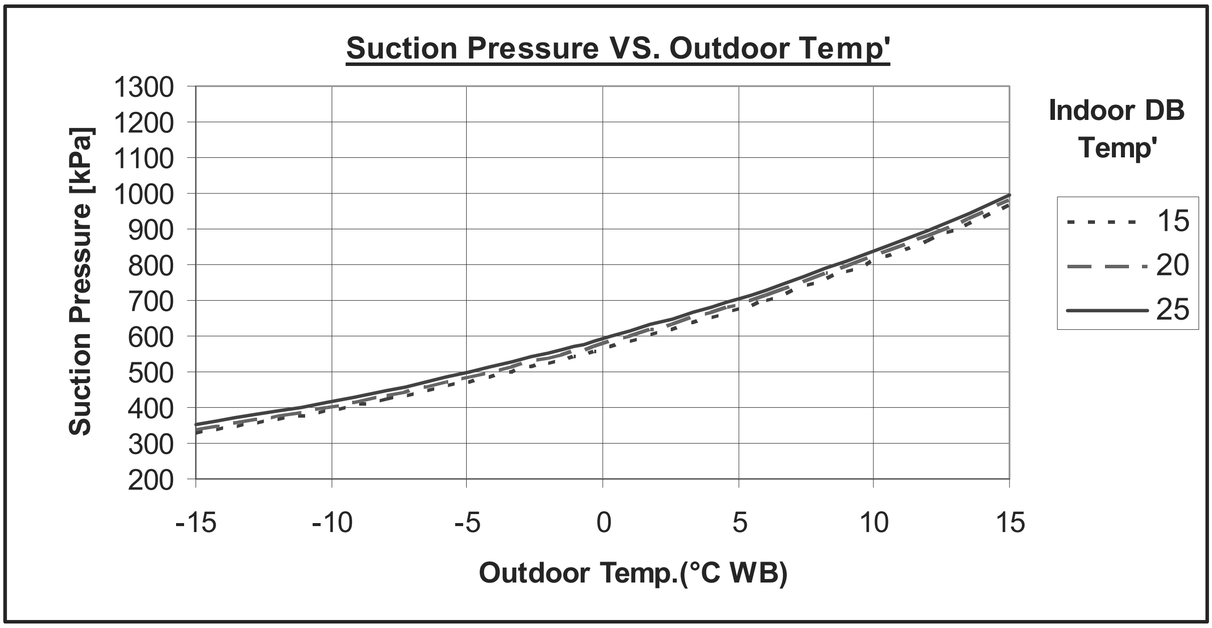
6.1 Model: FLO 9 DCI

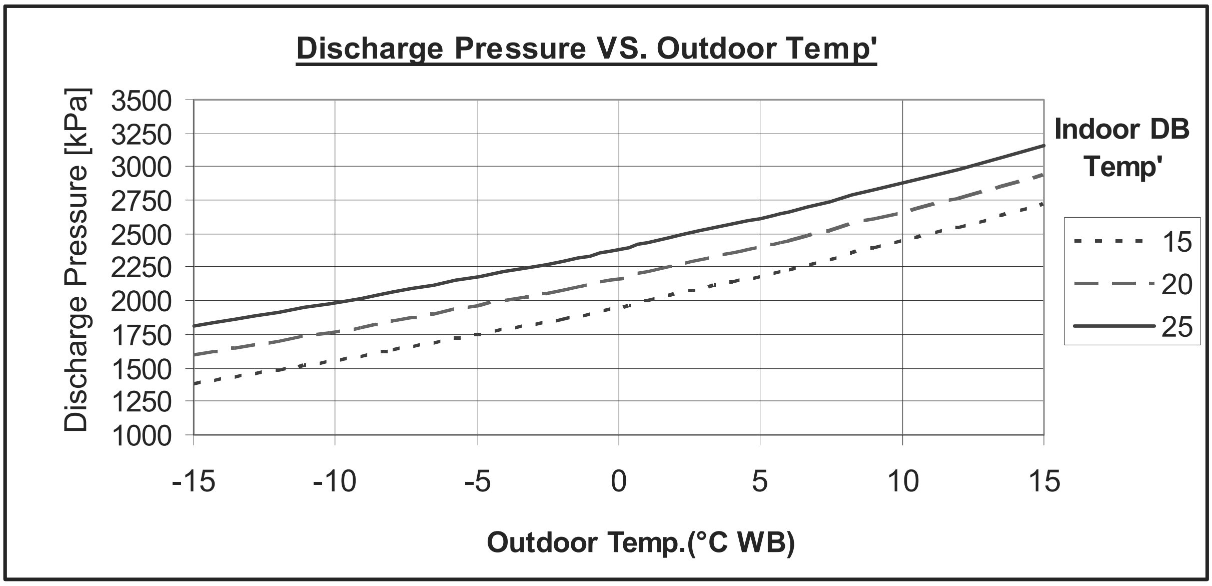
6.1.1 Cooling - Test Mode





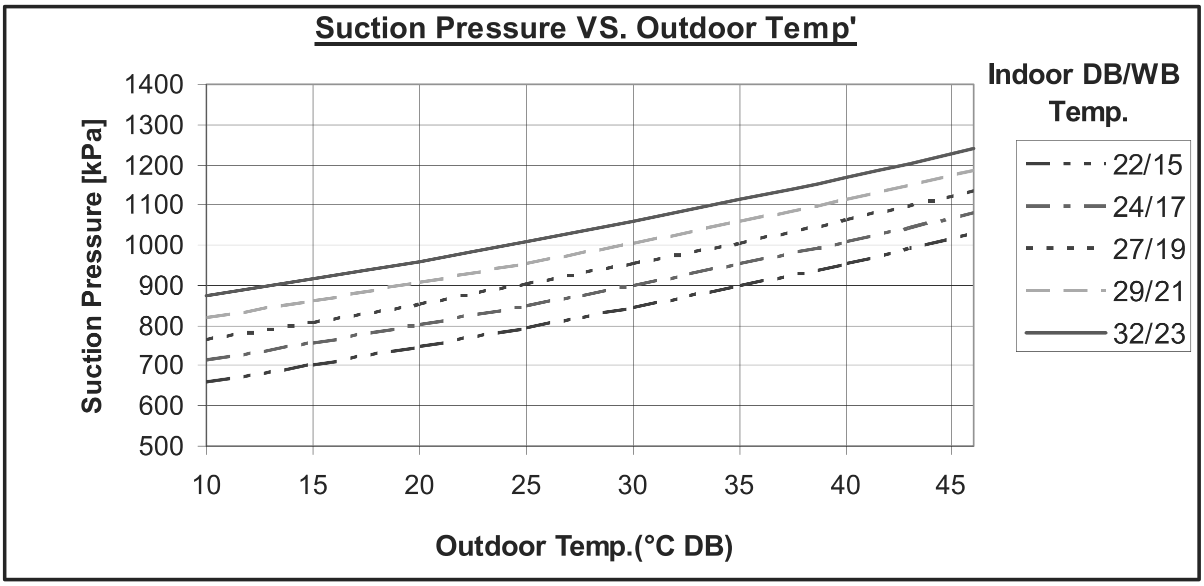
6.1.2 Heating - Test Mode

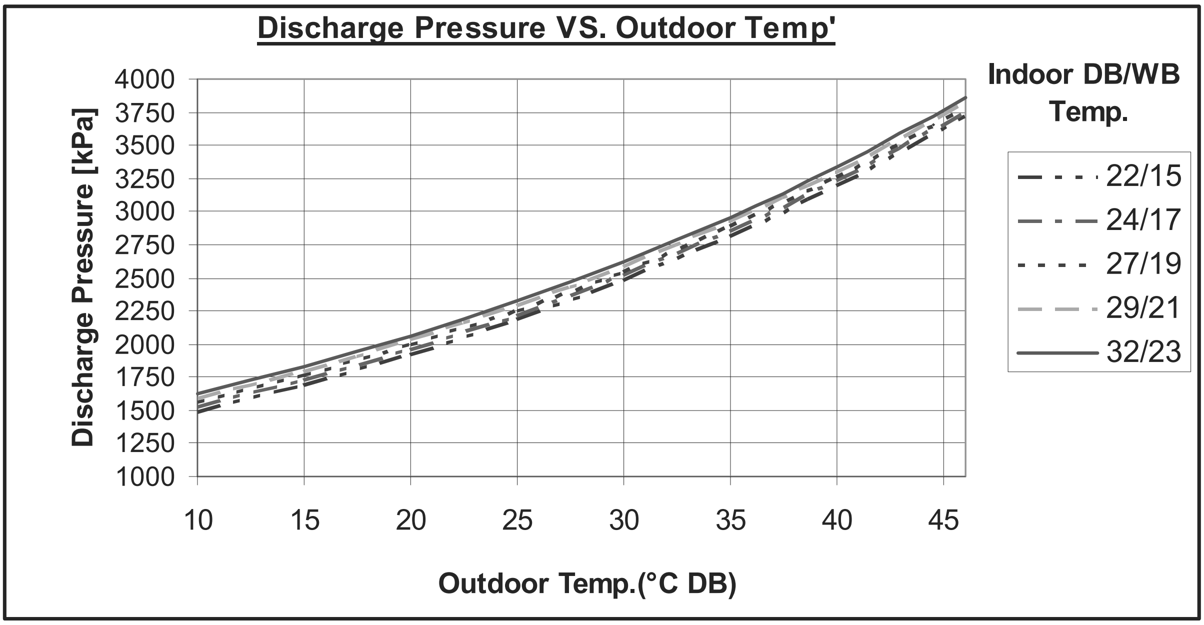




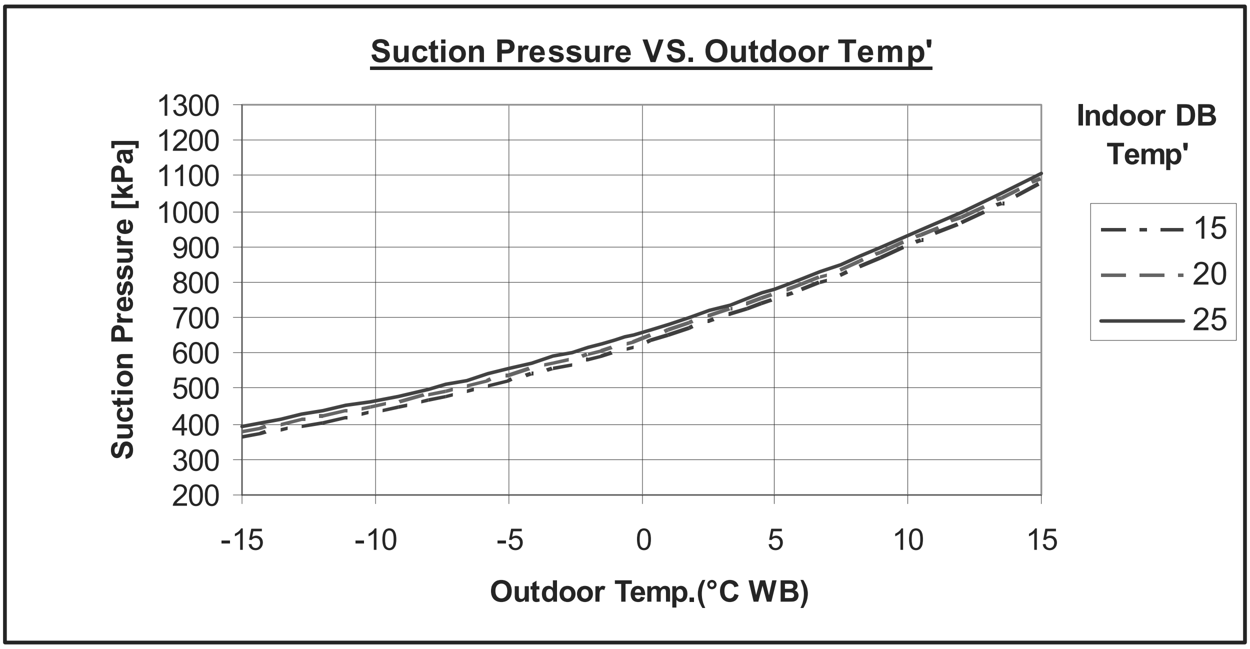
6.2 Model: FLO 12 DCI

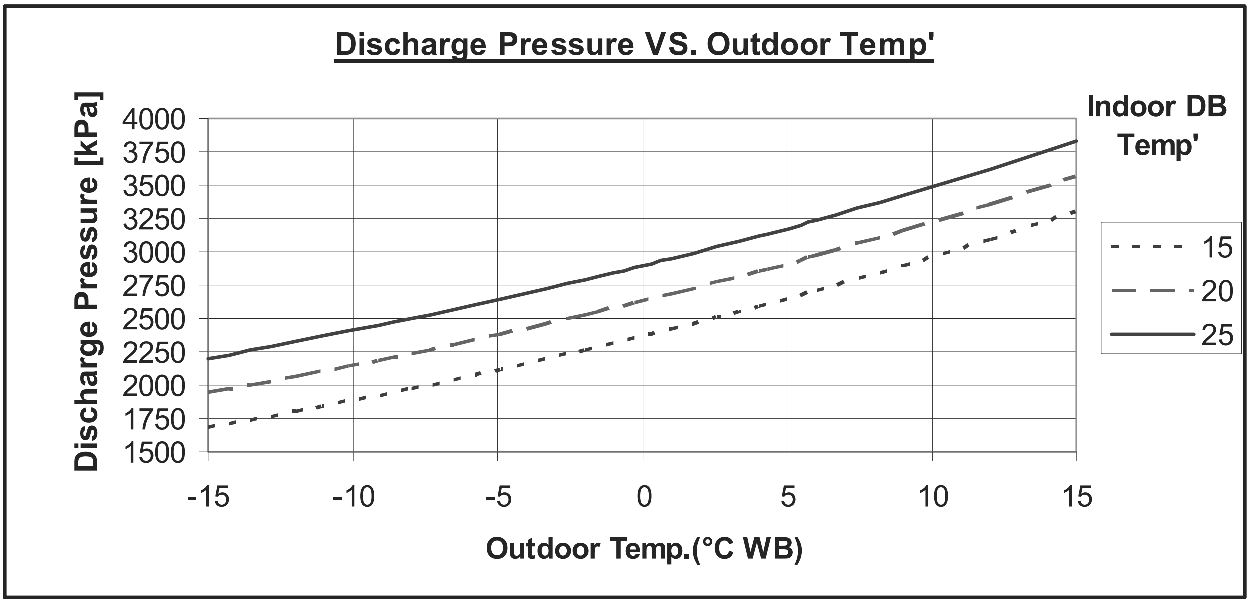
6.2.1 Cooling - Test Mode





6.2.2 Heating - Test Mode





7. ELECTRICAL DATA

7.1 Single Phase Unit

Model	FLO 9 DCI	FLO 12 DCI
Power Supply	1 PH ,220-240VAC ,50HZ	
Connected to	Indoor	
Maximum Current	10A	
Inrush Current \(a)	35A	
Starting Current\(b)	10A	
Circuit Breaker	16A	
Power Supply wiring no. x cross section	3 X 1.5 mm²	
Interconnecting cable no. x cross section	4 X 1.5 mm²	

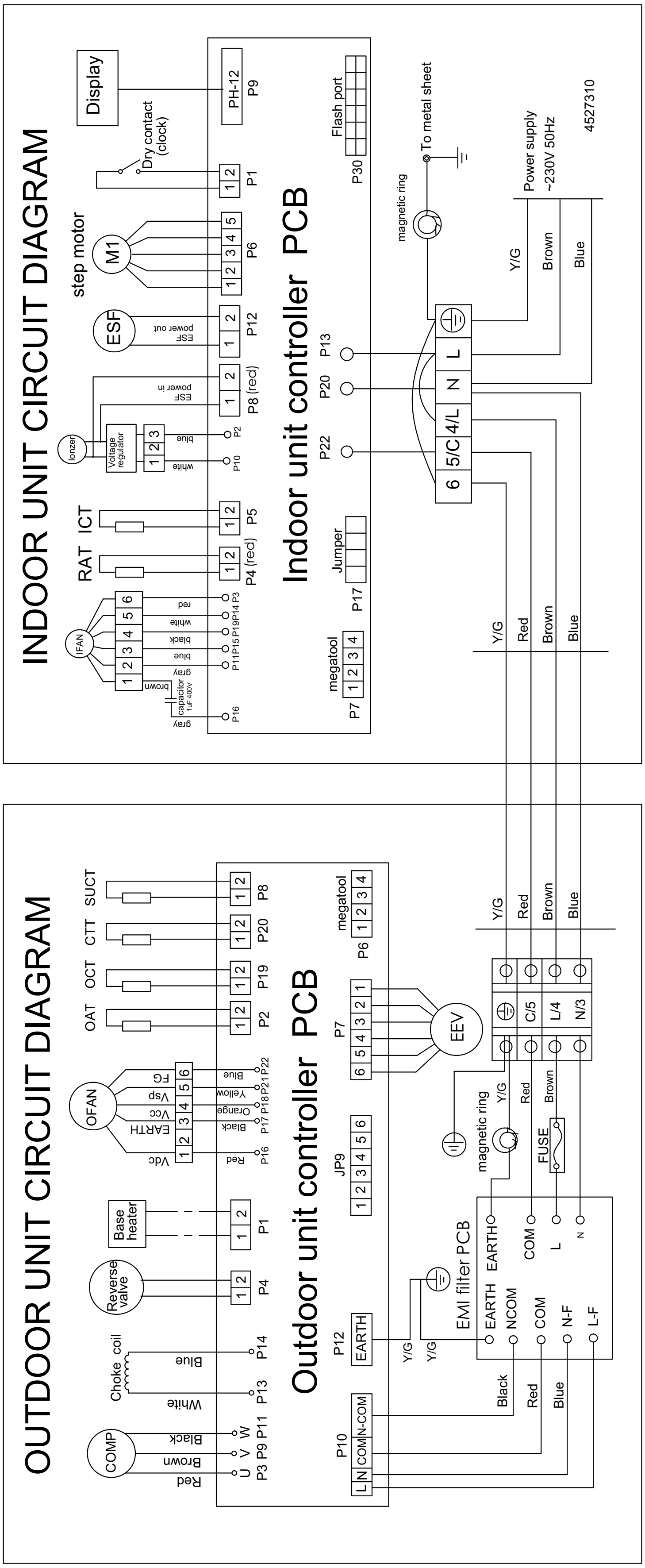
(a) Inrush current is the current when power is up (charging the DC capacitors at outdoor unit controller).
(b) Starting current is the current at compressor start up.

NOTE

Power wiring cord should comply with local lows and electrical regulations requirements.

8. WIRING DIAGRAMS

8.1 FLO 9 / 12 DCI

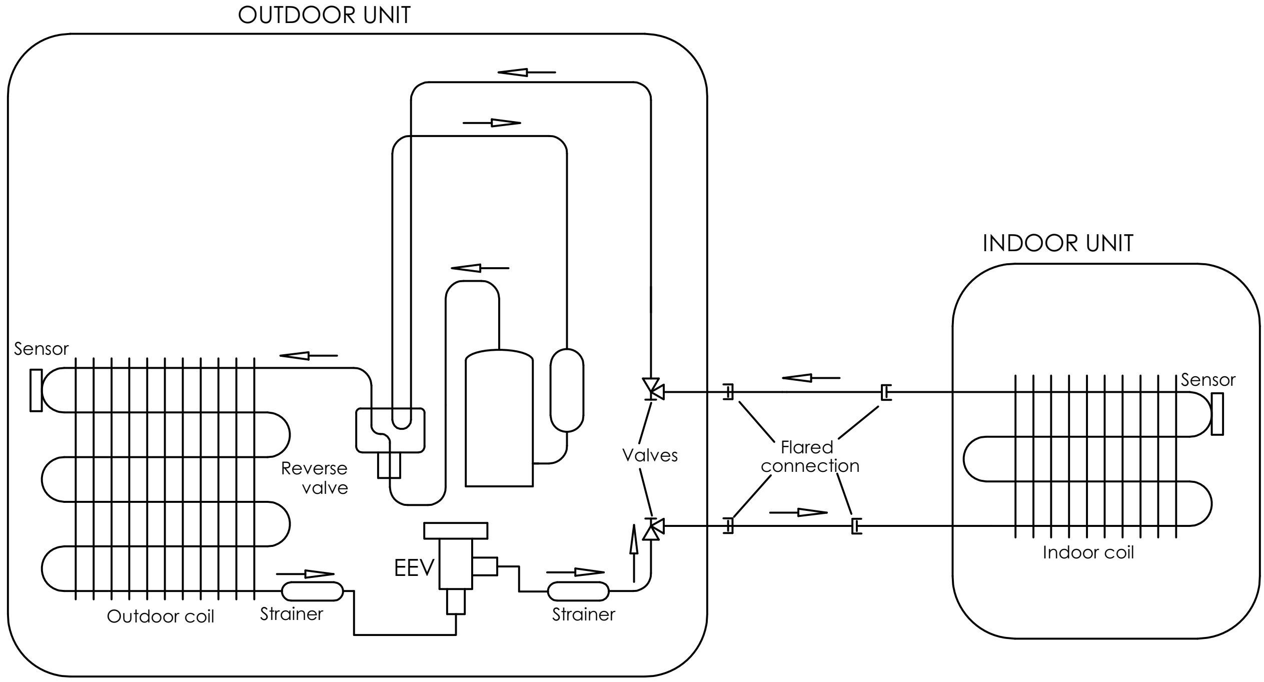


CONTENTS

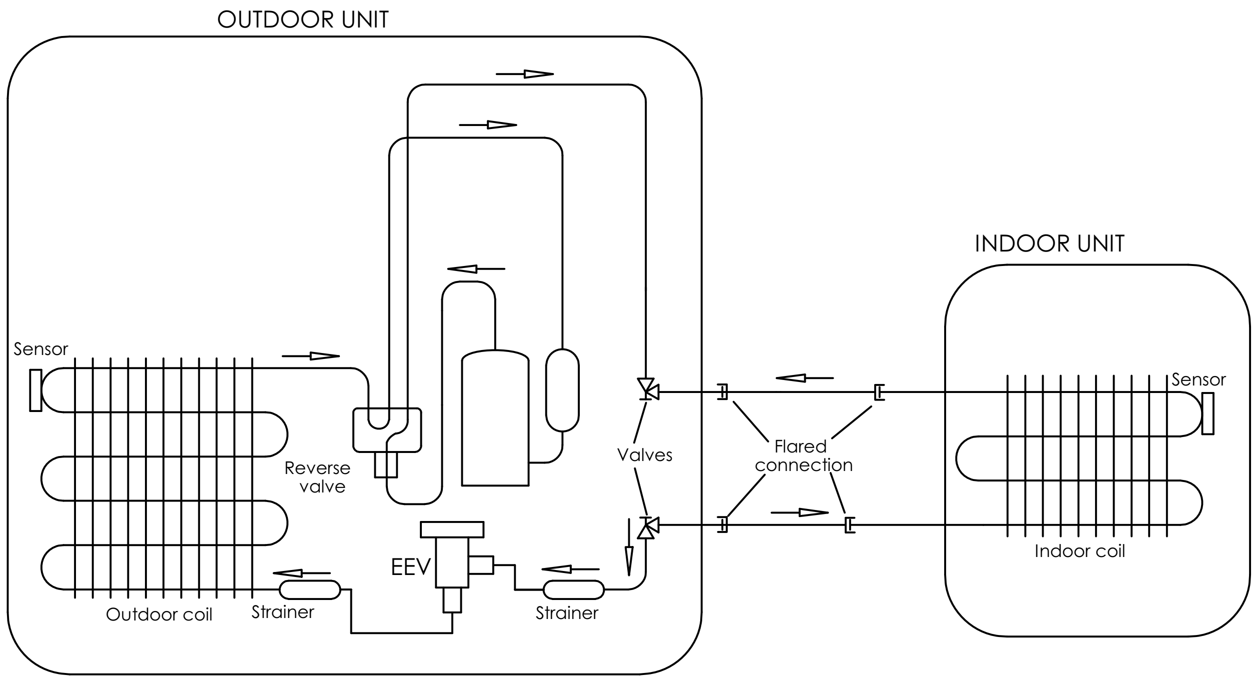
9. REFRIGERATION DIAGRAMS

9.1 Heat Pump Models

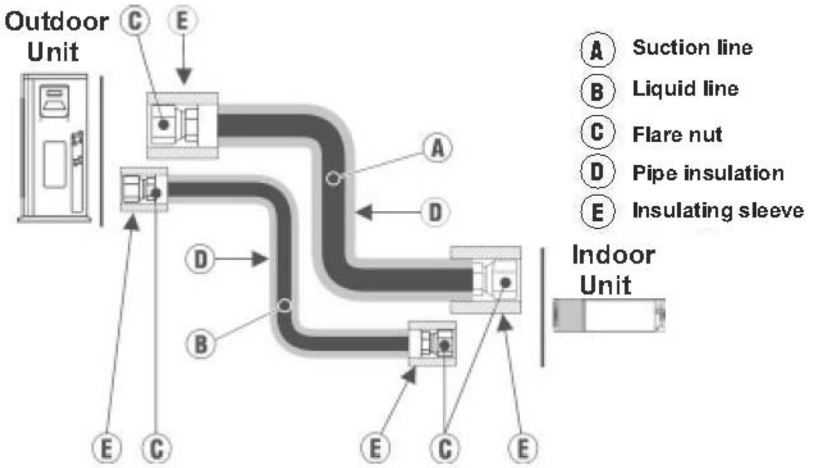
9.1.1 FLO 9 / 12 DCI: Cooling Mode

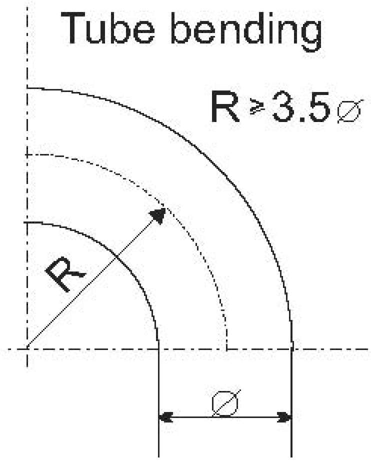


9.1.2 FLO 9 / 12 DCI: Heating Mode

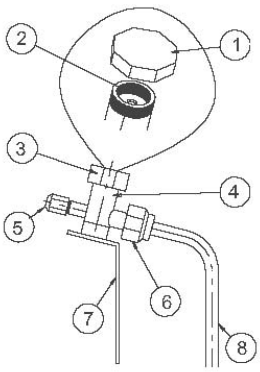


10. TUBING CONNECTIONS



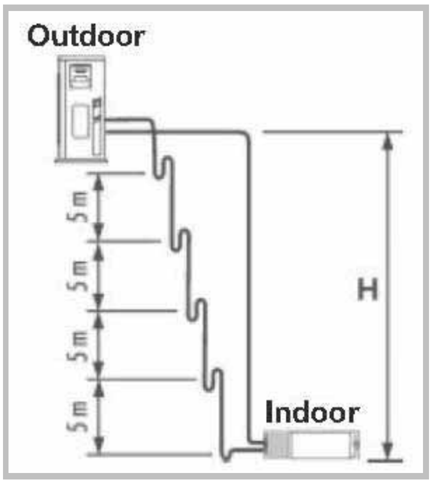


TUBE (Inch) / TORQUE (Nm)	1/4''	3/8''
Flare Nuts	11-13	40-45
Valve Cap	13-20	13-20
Service Port Cap	11-13	11-13



1. Valve Protection Cap-end
2. Refrigerant Valve Port (use Allen wrench to open/close)
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port Cap
6. Flare Nut
7. Unit Back Side
8. Copper Tube

When the outdoor unit is installed above the indoor unit an oil trap is required every 5m along the suction line at the lowest point of the riser. Incase the indoor unit is installed above the outdoor, no trap is required.



11. CONTROL SYSTEM

11.1 General Functions and Operating Rules

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].
The parameters values are given in the last section of this control logic chapter of the service manual.

11.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the System 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity nless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by a parameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

11.1.2 Compressor Frequency Control

11.1.2.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOAD calculation, the indoor fan speed, and the power shedding function.

NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed	Maximum NLOAD Cooling	Maximum NLOAD Heating
Low	*Max NLOADIF1C*	127
Medium	*Max NLOADIF2C*	127
High	*Max NLOADIF3C*	127
Turbo	*Max NLOADIF4C*	127
Auto	*Max NLOADIF5C*	127

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cool	No limit	Nominal Cooling
Heat	No limit	Nominal Heating

11.1.3 Target Frequency Setting

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.
Basic Target Frequency Setting:

NLOAD	Target Frequency
127	*Maximum frequency*
10 < NLOAD < 127	Interpolated value between minimum and maximum frequency
10	*Minimum frequency*
0	Compressor is stopped

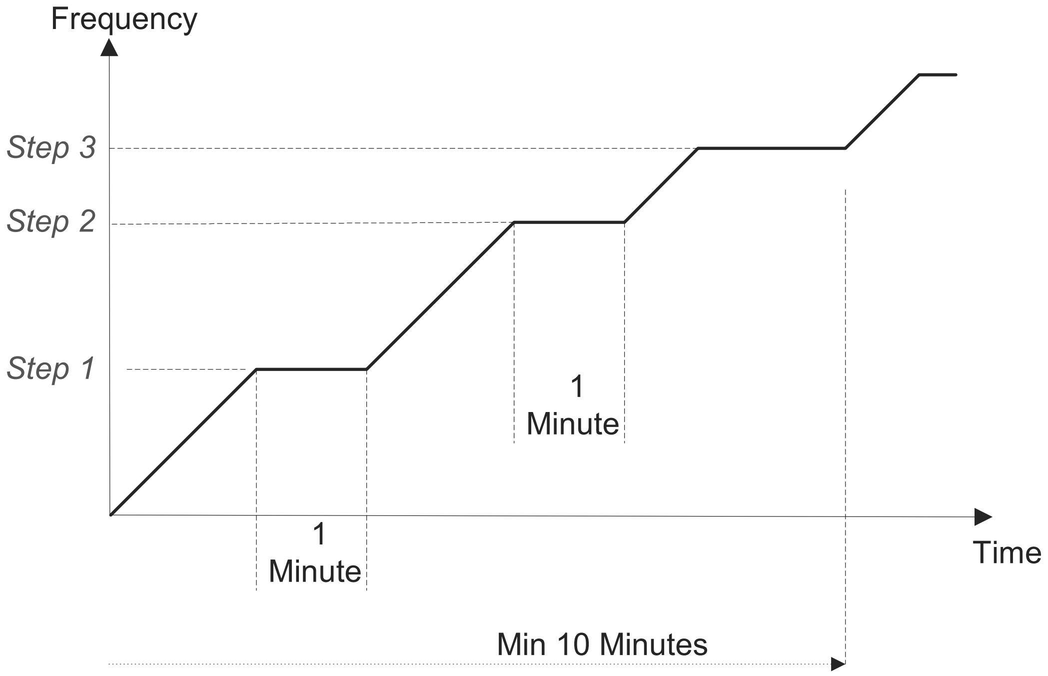
Target frequency limits as a function of outdoor air temperature)OAT(:

OAT Range	Cool mode limits	Heat mode limits
OAT < 6	*MaxFreqAsOATC*	No limit
6 ≤ OAT < 15		*MaxFreqAsOAT1H*
15 ≤ OAT < 24		*MaxFreqAsOAT2H*
24 ≤ OAT	No limit	

11.1.4 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

11.1.5 Compressor Starting Control



11.1.6 Minimum On and Off Time

3 minutes.

11.1.7 Indoor Fan Control

10 Indoor fan speeds are determined for each model. 5 speeds for cool/dry/fan modes and 5 speeds for heat mode.
When user sets the indoor fan speed to a fixed speed)Low/ Medium/ High(, unit will operate constantly at set speed.
When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

11.1.7.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:
Difference between set point and actual room temperature is bigger then 3 degrees.
Room temperature > 22 for cooling, or < 25 for heating.

11.1.8 Heating Element Control

Heating element can be started if LOAD > 0.8* MaximumNLOAD AND Indoor Coil temperature <45.
The heating element will be stopped when LOAD < 0.5* MaximumNLOAD OR if Indoor Coil Temperature > 50.

11.1.9 Outdoor Fan Control

7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).
4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

Routine	Conditions
A	Heating with OAT < 15^{0}C or Cooling with OAT > 20^{0}C, or HST > 50^{0}C or Faulty OAT
B	Cooling with 20^{0}C > OAT > 50^{0}C
C	Cooling with 7^{0}C > OAT
D	Heating with OAT > 15^{0}C

	Outdoor Fan Speed			
Compressor Frequency (CF)	Routine A	Routine B	Routine C	Routine D
CF= 0	OFF	OFF	OFF	OFF
10 ≤ CF < *OFLowFreq*	Low	Low	Very Low	Low
10 ≤ CF < *OFMedFreq*	Medium	Low	Very Low	Low
OFMedFreq ≤ CF	High	Low	Low	Medium

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.

11.1.10 EEV (electronic Expansion valve) Control

EEV opening is defined as EEV = $EEV_{OL} + EEV_{CV}$
EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.
EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature.
During the first 10 minutes of compressor operation $EEV_{CV} = 0$.
Once the first 10 minutes are over, the correction value is calculated as follow: $EEV_{CV}(n) = EEV_{CV}(N-1) + EEV_{CTT}$
EEV_{CTT} is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

11.1.11 Reversing Valve (RV) Control

Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

11.1.12 Ioniser Control

Ioniser is on when unit is on AND indoor fan is on AND Ioniser power switch (on Ioniser) is on.

11.1.13 Electro Static Filter)ESF(Control

ESF is on when ESF switch is on, Safety switch is pressed, unit is on, AND indoor fan is on.

11.1.14 Base Heater Control

When OAT is connected, Base Heater will be on when unit is in heating and OAT<2^0C.
When OAT is disconnected, Base Heater will be on when unit is in heating.

11.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusting automatically according to the difference between actual room temperature and user set point temperature.

11.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be ad8usted automatically according to the calculated NLOAD.

11.4 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adng to the calculated
NLOAD.

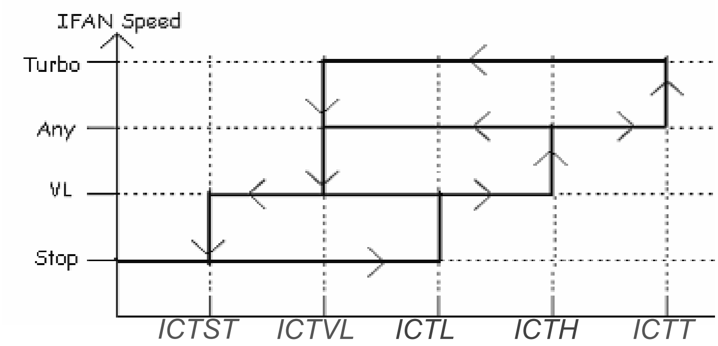
11.4.1 Temperature Compensation

In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit controller.

Model	J2 Shorted	J2 Opened
Wall mounted	Compensation Disabled	Compensation Enabled
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled
Floor/Ceiling	Compensation Disabled	Compensation Enabled

11.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



11.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature)ΔT(.
Unit will switch from cool to heat when compressor is off for 3 minutes, and ΔT < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and ΔT < -3.

11.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

11.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.
HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.
Stop Compressor (SC) – Compressor is stopped.

11.7.1 Indoor Coil Defrost Protection

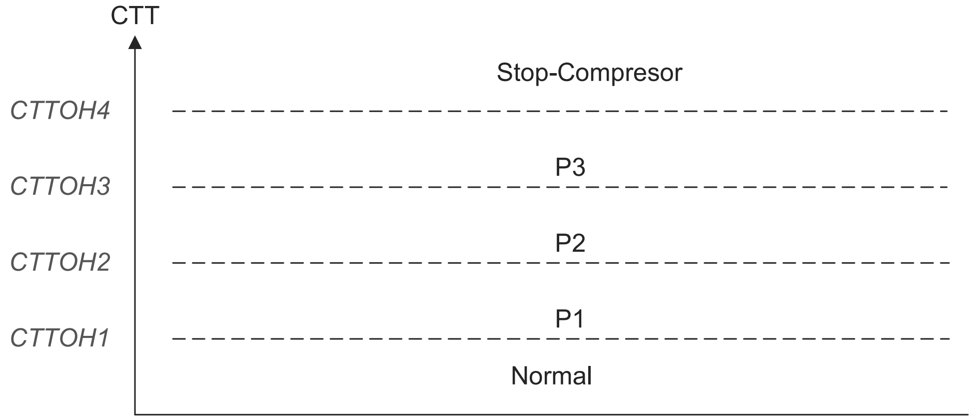
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

11.7.2 Indoor Coil over Heating Protection

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT> 55	SC	SC	SC	SC	SC
53 <ICT ≤ 55	D1	D1	D2	D2	D2
49 < ICT ≤ 53	SR	SR	D1	D2	D2
47 < ICT ≤ 49	SR	SR	SR	D1	D2
45 < ICT ≤ 47	Norm	Norm	SR	SR	D1
43 < ICT ≤ 45	Norm	Norm	Norm	SR	SR
ICT ≤ 43	Normal				

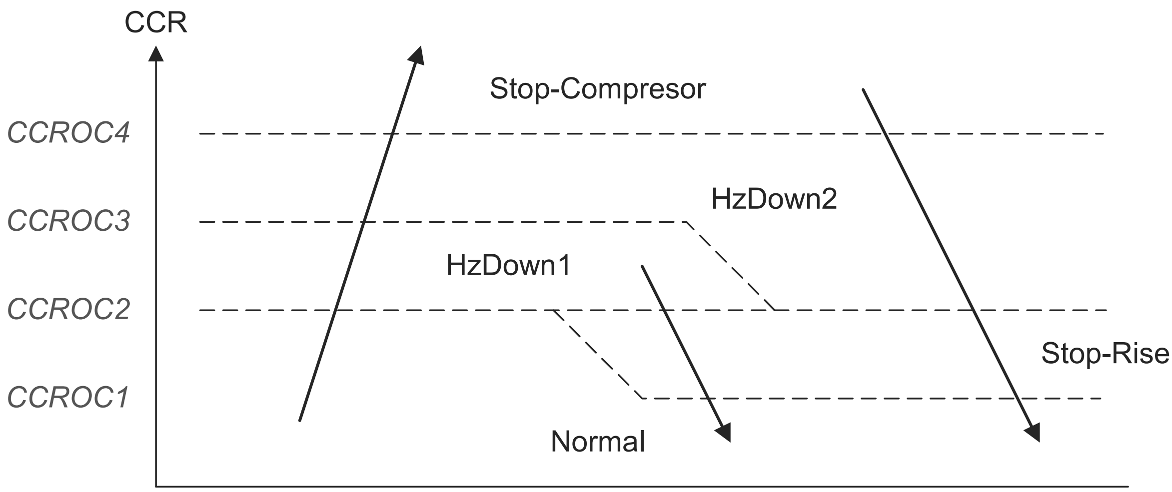
11.7.3 Compressor over Heating Protection

Compressor temperature can be in one of 5 control zones)4 in protection, and 1 normal(, according to the following chart.



Control Status	Compressor Temperature Increases	Else
P1	Norm	SR
P2	D1	SR
P3	D2	D1
Stop Compressor	SC	

11.7.4 Compressor over Current Protection



11.7.5 Heat Sink Over Heating Protection (NA for DCI 25 and 35)

HST	HST Trend		
	Decreasing	No Change	Increasing
HST > 90	SC	SC	SC
85 < HST ≤ 90	D1	D2	D2
82 < HST ≤ 85	SR	D1	D2
80 < HST ≤ 82	SR	SR	D1
78 < HST ≤ 80	Norm	Norm	SR
HST ≤ 78	Normal		

11.7.6 Outdoor Coil Deicing Protection

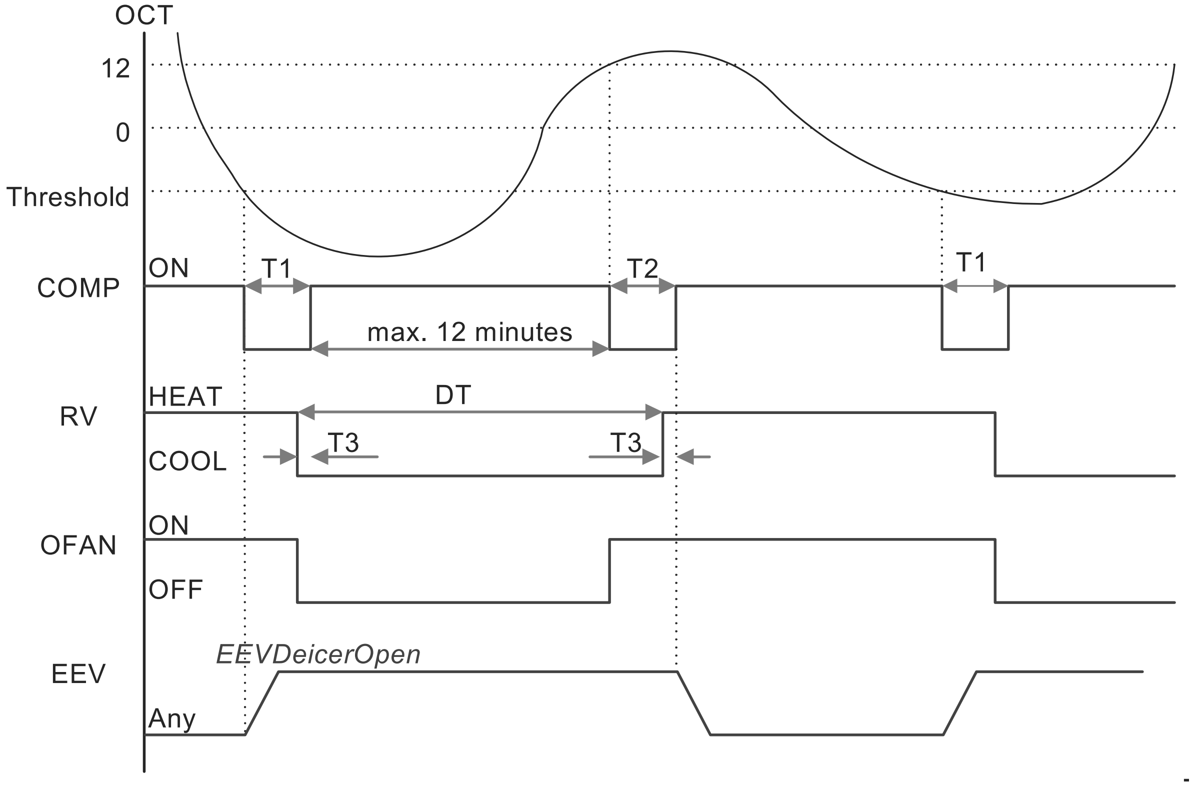
11.7.6.1 Deicing Starting Conditions

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT - 8
Case 5: NLOAD = 0 AND OCT < OAT -8

OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)

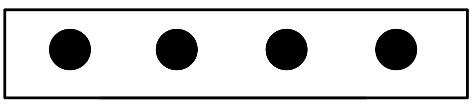
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

11.7.6.2 Deicing Protection Procedure



36 seconds, T3 = 6 seconds

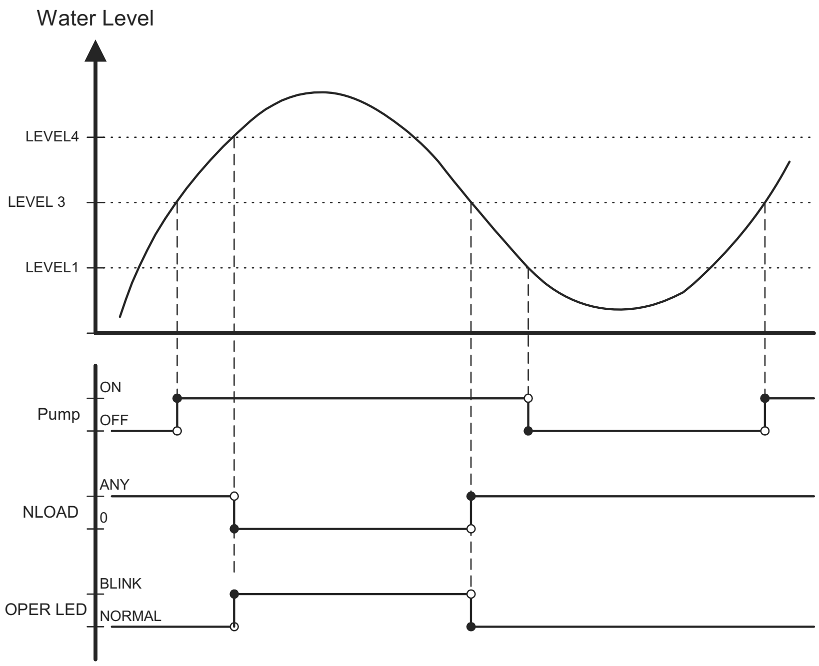
11.8 Condensate Water Over Flow Protection



Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

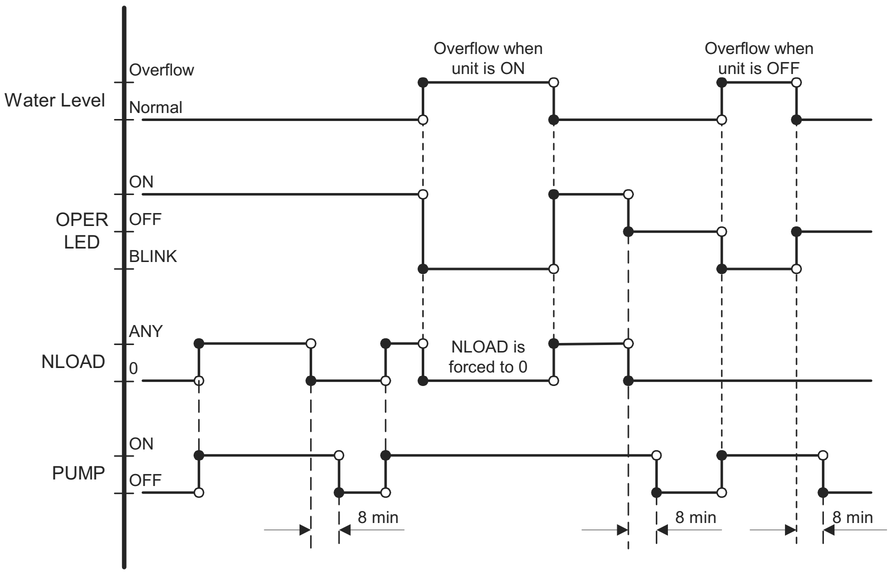
11.8.1 3 Levels Logic (used in floor/ceiling models)

P2	P3	Level
0	0	L0
1	0	L1
1	1	L2&3
0	1	L4



11.8.2 1 Level Logic (used in all models except for floor/ceiling models)

P2	P3	Level
Don`t care	1	Normal
Don`t care	0	Overflow



11.9 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J8.

	Function	Contact = Open	Contact = Short
J8 = Open	Presence Detector Connection	No Limit	Forced to STBY
J8 = Open	Power Shedding Function	No Limit	Limit NLOAD

11.10 Operating the Unit from the Mode Button

Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

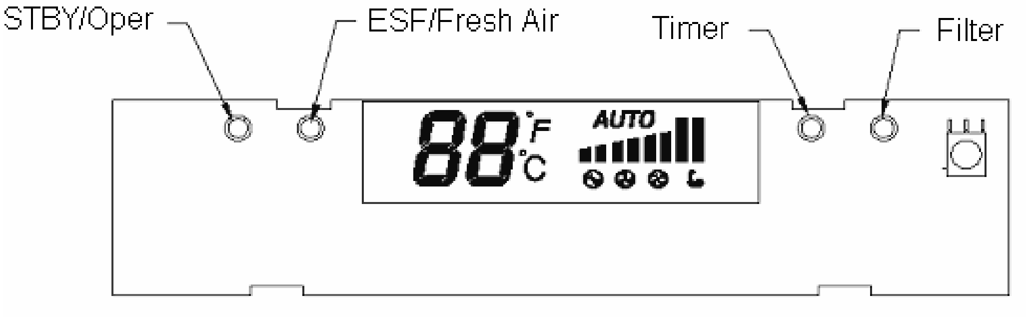
Forced operation Mode	Pre-set Temperature
Cooling	$20^{0}C$
Heating	$28^{0}C$

11.11 On Unit Controls and Indicators

11.11.1 Indoor Unit Controller Controls and Indicators For All Models Except for Floor/Ceiling model

STAND BY INDICATOR	Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	Lights up during operation. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected.

11.11.2 Indoor Unit Controls and Indicators for LCD Display



	STBY	Cool	Heat	Auto	Fan	Dry
88	OFF	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)
C	OFF(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)
F	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)
(Low)	OFF	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed
(Med)	OFF					
(High)	OFF					
(Turbo)	OFF					
AUTO (Auto)	OFF					
Backlight(red)	OFF	OFF	ON(3*)	ON(3*)	ON(3*)	OFF
Backlight(green)	OFF	ON(3*)	OFF	ON(3*)	ON(3*)	ON(3*)

11.11.3 Indoor Unit Controller Controls and Indicators for Floor/Ceiling Model

STANDBY INDICATOR	Lights up when the Air Conditioner is connected to power and is ready for operation
OPERATE INDICATOR (4)	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	1. Lights up when Air Filter needs to be cleaned. 2. Blinks during Water Over Flow in PXD models. (Cf. Sect. 7.3)
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
FAN MODE INDICATOR (4)	Lights up in Fan Mode activated by local switches.
FAN SPEED INDICATORS	L -- Lights up when IFAN setting is Low. M -- Lights up when IFAN setting is Medium. H -- Lights up when IFAN setting is High. A -- Lights up when IFAN setting is Auto.
TEMP. SETTING INDICATORS	Each one of the seven indicators indicates the following SPT: 18, 20, 22, 24, 26, 28, 30]^{o}c[. The odd number temperatures are indicated by turning on the two adcent indicators.
FAN SPEED BUTTON	Press this button to change the speed of the IFAN. Each pressing change the speed in the sequence of: ..... L → M → H → Auto → L → ...
TEMP. SETTING UP BUTTON	Pressing this button increases the SPT by 1°C. Note: The Max SPT is 30°C.
TEMP. SETTING DOWN BUTTON	Pressing this button decreases the SPT by 1°C. Note: The Min SPT is 18°C.
MODE BUTTON	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
POWER BUTTON	Toggle the unit between OPER & STBY modes.
RESET / FILTER BUTTON	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

11.11.4 Outdoor Unit Controller Indicators

Unit has three LED
SB LED is ON when power is ON (230 VAC, even when no communication).
STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.
FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

11.12 Jumper Setting

11.12.1 Indoor Unit Controller

0 = Open Jumper (disconnect jumper).
1 = Close Jumper (connect jumper).
Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Compensation Jumper – J2

Model	J2 (Default)	Compensation
Wall Mounted	0	Activated
Floor/Ceiling	1	Deactivated
Ducted/cassette	1	Activated

Family selection Jumper – J3, J4 and J5

Family	J5	J4	J3
Reserved	0	0	0
Reserved	0	0	1
Reserved	0	1	0
Wall Mounted (WNG/FLO)	0	1	1
Floor/Ceiling (PXD)	1	0	0
Reserved	1	0	1
Ducted (LS)	1	1	0
Cassette (K)	1	1	1

IDU Model	Jumper Setting					
	J8	J7	J6	J5	J4	J3
FLO 9	0	0	0	0	1	1
FLO 12	0	1	0	0	1	1
FLO 18	0	0	1	0	0	0
FLO 28	0	0	1	0	0	1
SX 9	0	0	0	1	0	0
SX 12	0	1	0	1	0	0
SX 18	1	0	0	1	0	0
K 9	0	0	0	1	1	1
K 12	0	1	0	1	1	1
K 18	1	0	0	1	1	1
LS12	0	1	0	1	1	0

For wall mounted units Jumpers j7, j8 can be configured by service. All other jumpers on the above table are factory default (cannot be changed by service).
For unit types as Cassettes, floor ceiling, and ducted, jumpers are set by a model plug.

Model selection Jumper – J7, J8

Model	J8 J7
A	0 0
B	0 1
C	1 0
D	1 1

J9- Presence Detector/Power Shedding

OPERATION	J9
Presence Detector	0
Power Shedding	1

Jumper – J10

OPERATION	J10
WNG DCI LCD	0
LED	1

11.12.2 Outdoor Unit Controller

JP9 JUMPER LAYOUT

Reserved *(PIN 9)*	**ODU3** *(PIN 7)*	**ODU2** *(PIN 5)*	**ODU1** *(PIN 3)*	**ODU0** *(PIN 1)*
GND *(PIN 10)*	**GND** *(PIN 8)*	**GND** *(PIN 6)*	**GND** *(PIN 4)*	**GND** *(PIN 2)*

ODU MODEL SELECTION

ODU3	ODU2	ODU1	ODU0	ODU Model
OFF	OFF	OFF	OFF	Reserved
OFF	OFF	OFF	ON (PIN1 & PIN2)	A (DCI 25)
OFF	OFF	ON (PIN3 & PIN4)	OFF	B (DCI 35)
OFF	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	C (DCI 50)
OFF	ON (PIN5 & PIN6)	OFF	OFF	D
OFF	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	E (Duo)
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	F
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	G
ON (PIN7 & PIN8)	OFF	OFF	OFF	H
ON (PIN7 & PIN8)	OFF	OFF	ON (PIN1 & PIN2)	I
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	OFF	J
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	K
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	OFF	L
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	M
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	N
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 ? PIN4)	ON (PIN1 & PIN2)	O

11.13 Test Mode

11.13.1 Entering Test Mode

System can enter Test mode in two ways:
Automatically when the following conditions exists for 30 minutes continuously:
Mode = Cool, Set point =16, Room temperature = 27±1, Outdoor temperature = 35±1
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±1
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

11.13.2 Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

Indoor Fan Speed Setting	Unit Setting
Low	Minimum Capacity Setting
High	Nominal Capacity Setting
Auto	Maximum Capacity Setting

During test mode, protections are disabled, except for stop compressor status.

11.14 SW Parameters

11.14.1 Indoor Units SW Parameters

General Parameters for All Models:

Parameters defining the indoor fan speed as a function of Indoor Coil temperature in heat mode (ICT):

ICTST Speed	ICT to stop indoor fan	25
ICTVLSpeed	ICT to go down to very low speed	28
ICTLSpeed	ICT to start in very low speed	30
ICTHSpeed	ICT to start in increase speed from very low	32
ICTTSpeed	ICT to enable Turbo fan speed	40

Model Depended Parameters:

Parameter name	Wall Mounted Models	
	DCI 9	DCI 12
NLOAD limits as a function of selected indoor fan speed		
MaxNLOADIF1C	40	40
MaxNLOADIF2C	53	53
MaxNLOADIF3C	120	120
MaxNLOADIF4C	127	127
MaxNLOADIF5C	127	127
Indoor Fan speeds		
IFVLOWC	700	700
IFLOWC	800	800
IFMEDC	900	950
IFHIGHC	1050	1100
IFTURBOC	1150	1200
IFVLOWH	700	700
IFLOWH	800	850
IFMEDH	950	1000
IFHIGHH	1100	1150
IFTURBOH	1200	1250
Nominal Compressor Frequency		
NomLoadC	40	62
NomLoadH	55	67

Parameter Name	Cassette Models			
	K 9	K 12	K 12S	K18
NLOAD limits as a function of selected indoor fan speed				
MaxNLOADIF1C	40	40	40	40
MaxNLOADIF2C	53	56	56	60
MaxNLOADIF3C	120	90	90	90
MaxNLOADIF4C	127	90	90	90
MaxNLOADIF5C	127	90	90	90
Nominal Compressor Frequency				
NomLoadC	40	60	56	63
NomLoadH	55	69	73	80

11.14.2 Outdoor Units SW Parameters

Parameter Name	DCI 9	DCI 12	DCI 18	DCI 50 DUO
Compressor Parameters				
MinFreqC	30	33	20	20
MaxFreqC	64	80	85	97
MinFreqH	30	35	20	26
MaxFreqH	81	93	99	106
Step1Freq	60	60	60	60
Step2Freq	70	70	70	80
Step3Freq	90	90	90	90
Frequency limits as a function of outdoor air temperature				
MaxFreqAsOATC	50	50	64	62
MaxFreqAsOAT1H	65	75	85	85
MaxFreqAsOAT2H	60	60	60	60
Compressor Over Heating Protection				
CTTOH1	94	94	94	90
CTTOH2	98	98	98	95
CTTOH3	102	102	102	102
CTTOH4	105	105	105	105
Compressor Over Current Protection [A]				
CCR01	7.1	7.1	10	10
CCR02	7.5	7.5	10.5	10.5
CCR03	7.9	7.9	10.8	10.8
CCR04	8.3	8.3	11.2	11.2
Outdoor Fan Speed (RPM)				
VL	200	200	200	200
OFLOWC	550	550	600	600
OFMEDC	700	700	760	830
OFMAXC	830	830	920	920
OFLOWH	550	550	600	600
OFMEDH	700	700	830	920
OFMAXH	830	830	1000	1000
Outdoor Fan Limit Control				
OFLowFreq	45	45	40	40
OFMedFreq	57	57	70	70

12. TROUBLESHOOTING FLO 9 / 12 DCI

Warning

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE
Never open the Outdoor unit before turning off the PowerHIG
When turned off, the system is still charged (400V)yle
It takes about 4 Min. to discharge the system.
Touching the controller before discharging may cause an electrical shock

For safe handling of the controller please refer to section 12.6 below.

12.1 Single Split system failures and corrective actions

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
1	Power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If power supply is OK, check display and display wiring. if OK, replace controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light up)	Unit in heat mode and coil is still not warm.	Change to cool mode and check.
		Problem with PCB or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem	Replace controller
6	Compressor does not start	Electronics control problem or protection	Perform diagnostics (See 12.3 below), and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics (See 12.3 below), and follow the actions described.

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure in section 12.5.3 below, if not OK replace controller
9	Unit works in wrong mode)cool instead of heat or heat instead of cool(	Electronics or power connection to RV	Check RV power connections, if OK, Check RV operation with direct 230VAC power supply, if OK, Replace outdoor controller.
10	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics)See 12.3 below(, and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics (See 12.3 below), and check if units is operating by EEPROM parameters.

12.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in Test Mode (in Test mode, system operates in fixed settings). The performance curves given in this manual are given for unit performance in test mode when high indoor fan speed is selected.

Entering test mode:

Set unit to Cool/16 degrees/High indoor fan speed, or Heat/30 degrees/High indoor fan speed, and enter diagnostics.

12.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode button in any operation mode. Acknowledgment is by 3 short beeps and lights of COOL and HEAT LEDs. Then, every short pressing of Mode button will scroll between Indoor and Outdoor unit diagnostic modes by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.
During the Outdoor unit diagnostics all four Indoor LED’s, (STBY, Operate, Filter and Timer) are blinking. When Indoor diagnostics is displayed, all four LED’s (STBY, Operate, Filter and Timer) are ON.
When system enters diagnostics mode, only one fault code is shown. Order of priority is from the lower to the higher number. Diagnostics is continuously ON as long as power is ON. The current system operation mode will not be changed.
If no fault occurred in the system, no fault code will be displayed during normal operation mode. The last fault code will be displayed even if the system has recovered from that fault. The last fault will be deleted from the EEPROM after the system has exit diagnostics mode.
In diagnostics mode, system fault / status will be indicated by blinking of Heat d Cool LEDs. The coding method will be as follows:
Heat LED will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool LED will blink during the same 5 seconds according to the following Indoor / Outdoor unit tables:
Note: 0 – OFF, 1-ON

12.3.1 Indoor unit Diagnostics

No	Problem	5	4	3	2	1
1	RT-1 is disconnected	0	0	0	0	1
2	RT-1 is shorted	0	0	0	1	0
3	RT-2 is disconnected	0	0	0	1	1
4	RT-2 is shorted	0	0	1	0	0
5	Reserved	0	0	1	0	1
7	Communication mismatch	0	0	1	1	1
8	No Communication	0	1	0	0	0
9	No Encoder	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Outdoor Unit Fault	0	1	0	1	1
...	Reserved					
17	Defrost protection	1	0	0	0	1
18	Deicing Protection	1	0	0	1	0
19	Outdoor Unit Protection	1	0	0	1	1
20	Indoor Coil HP Protection	1	0	1	0	0
21	Overflow Protection	1	0	1	0	1
22	Reserved					
24	EEPROM Not Updated	1	1	0	0	0
25	Bad EEPROM	1	1	0	0	1
26	Bad Communication	1	1	0	1	0
27	Using EEPROM data	1	1	0	1	1
28	Model A	1	1	1	0	0
29	Model B	1	1	1	0	1
30	Model C	1	1	1	1	0
31	Model D	1	1	1	1	1

12.3.2 Indoor unit diagnosis and corrective actions

No.	Fault	Probable Cause	Corrective Action
1	Sensor failures of all types		Check sensor connections or replace sensor.
2	Communication mismatch	Indoor and Outdoor controllers are with different Versions.	Replace Indoor controller.
3	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding.
4	No Encoder	Indoor electronics or motor.	Checkmotorwiring,ifok, replace motor, if still not ok, replace Indoor controller.
5	Outdoor Unit Fault	Outdoor controller problem.	Switch to Outdoor diagnostics.
6	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters.	No action, unless special parameters are required for unit operation.
7	Bad EEPROM		No action, unless special parameters are required for unit operation.
8	Bad Communication	Communication quality is low Reliability.	Check Indoor to Outdoor wiring and grounding.
9	Using EEPROM data	No problem. System is using EEPROM parameters.	

CONTENTS

12.3.3 Outdoor unit Diagnostics

No	Problem	5	4	3	2	1
1	OCT is disconnected	0	0	0	0	1
2	OCT is shorted	0	0	0	1	0
3	CTT is disconnected	0	0	0	1	1
4	CTT is shorted	0	0	1	0	0
5	HST is disconnected (when enabled)	0	0	1	0	1
6	HST is shorted (when enabled)	0	0	1	1	0
7	OAT is disconnected (when enabled)	0	0	1	1	1
8	OAT is shorted (when enabled)	0	1	0	0	0
9	TSUC is disconnected (when enabled)	0	1	0	0	1
10	TSUC is shorted (when enabled)	0	1	0	1	0
11	IPM Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage	0	1	1	1	1
16	IDU/ODU Communication mismatch	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	Reserved	1	0	0	1	0
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN locked	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
27	Bad Communication	1	1	0	1	1

1 – ON, 0 – OFF

Only one code is shown. Order of priority is 1-24. Diagnostics is continuously ON as long power is on.

12.3.4 Outdoor unit diagnosis and corrective actions

o.	Fault	Probable Cause	Corrective Action
	Sensors failures of all types		Check sensors connections or replace sensors.
	IPM Fault	Electronics HW problem	Check all wiring and umper settings, if OK, replace electronics.
	Bad EEPROM		No action, unless special parameters are required for unit operation.
	DC under/over Voltage	Electronics HW problem	Check outdoor unit power supply voltage
	AC under Voltage		Check outdoor unit power supply voltage
	Indoor / Outdoor unit Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
	Compressor Lock		Switch unit to STBY and restart
	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding

12.4 Judgment by MegaTool

MegaTool is a special tool to monitor the system states.
Using MegaTool requires:

- A computer with RS232C port.
- A connection wire for MegaTool.
- A special MegaTool software.

Use MegaTool according to following procedure:

- Setup MegaTool software: copy the software to the computer.
- Connect RS232C port in computer with MegaTool port in Indoor/Outdoor unit controller by the connection wire.
- Run the software and choose the COM port, you can monitor the A/C system state in monitor tab.

12.5 Simple procedures for checking the Main Parts

12.5.1 Checking Mains Voltage.

Confirm that the Mains voltage is between 198 and 264 VAC. If Mains voltage is out of this range, abnormal operation of the system is *expected.* If in range check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

12.5.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.
Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

12.5.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)
Check the voltage between lead wires according to the normal value as following:

- Between red wire and black wire: 310VDC +/- 20V
- Between orange wire and black wire: 15VDC +/- 1V
- Between yellow wire and black wire: 2-6VDC

12.5.4 Checking the Compressor.

The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. Check the resistance between three poles. The normal value should be below 0.5 ohm (TBD).

12.5.5 Checking the Reverse Valve (RV).

Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 220VAC.

12.5.6 Checking the electrical expansion valve (EEV).

The EEV has two parts, drive part and valve. The drive part is a step motor the valve. Check the drive voltage (12VDC). When Outdoor unit is power on, EEV shall run and have click and vibration.

12.6 Precaution, Advise and Notice Items

12.6.1 High voltage in Outdoor unit controller.

Whole controller, including the wires that are connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.
Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

12.6.2 Charged Capacitors

Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about four minutes after power is off. Touching the Outdoor unit controller before discharging may cause an electrical shock.

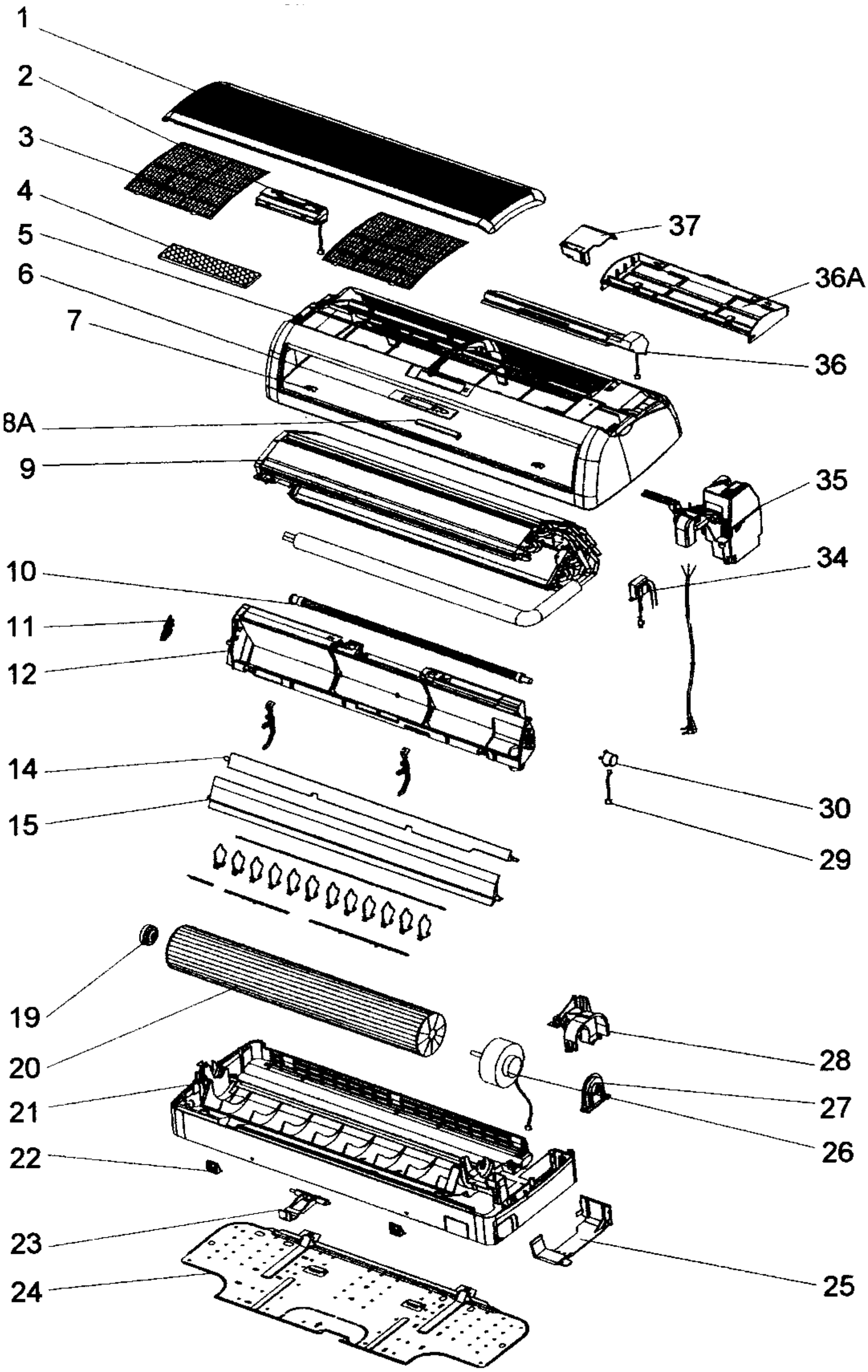
12.6.3 Additional advises

- When disassemble the controller or the front panel, turn off the power supply.
- When connecting or disconnecting the connectors on the PCB, hold the whole housing, dont pull the wire.
- There are sharp fringes and sting on shell. Use gloves when disassemble the A/C units.

13. EXPLODED VIEWS AND SPARE PARTS LISTS

13.1 Indoor Unit: FLO 9 / 12 DC INV

sans ionizer / without ionizer



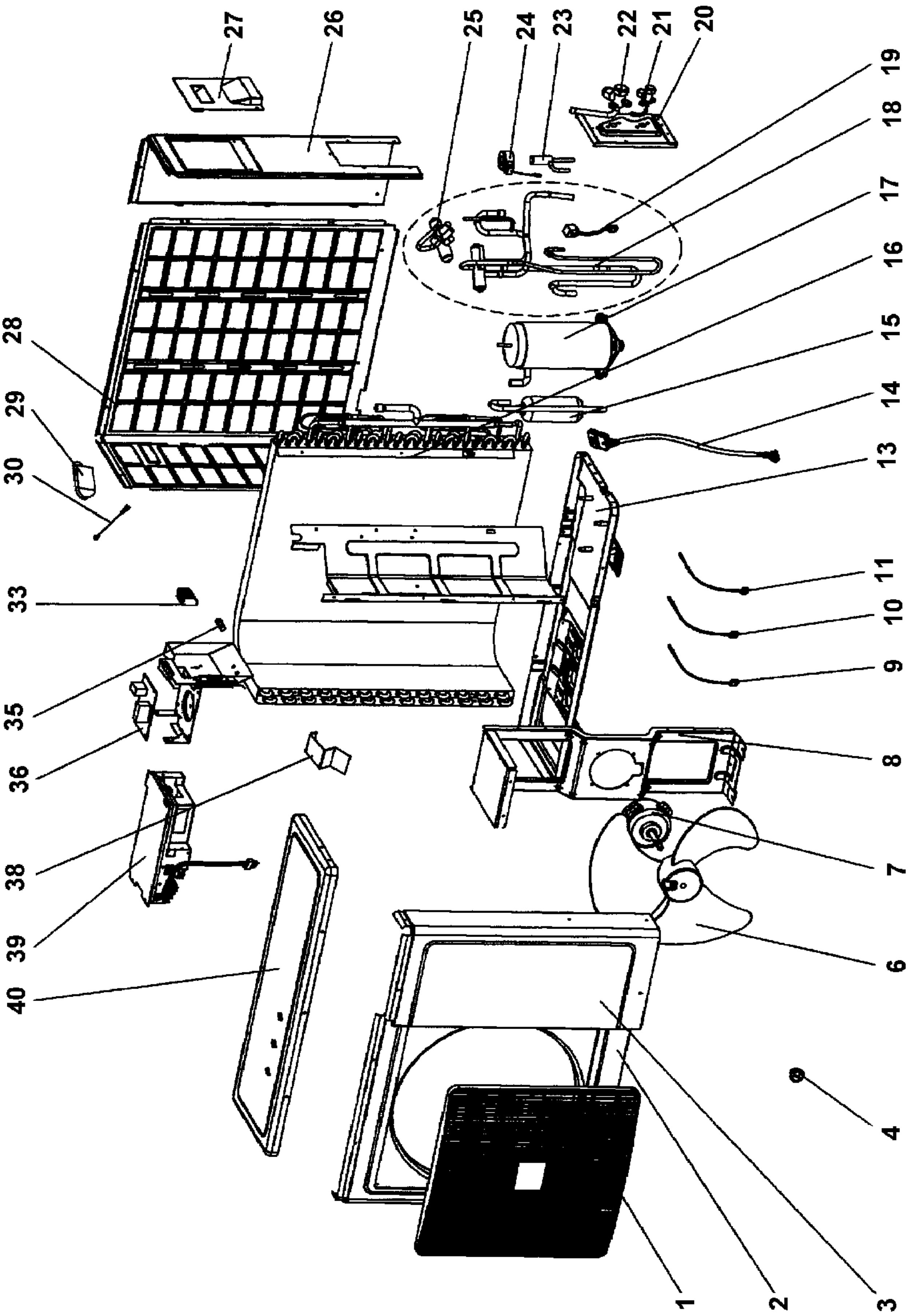
13.2 Indoor Unit: FLO 9 DC INV R410A

Loc	Spare parts code	Replaced by	Description	Observation	Qty
1	4526941		Grill		1
2	452811300		Display assembly		1
3	4518655		Air filter		2
4	4519132		Active charcoal filter		1
5	4527029		Front panel		1
6	4526946		Lens (display)		1
7	4526952		Screw cover		2
8	433133		Ionizer		1
9	4526389		Evaporator		1
10	4518664		Condensate drain pipe		1
11	4518682		Gear box assy		1
12	4527434		Air diffuser assembly		1
14	4518638		Upper louver		1
15	4526953		Lower louver		1
19	4518662		Bearing assembly		1
20	4518661		Turbine D 91		1
21	4518730		Bottom		1
22	4518656		Mounting hook		2
23	4518657		Tubes lock		1
24	4518670		Wall suport		1
25	4518654		Pipes clamp		1
26	4519864	4519864R	Fan motor 900/800/700rpm		1
27	4518651		Motor flange		1
28	4518650		Fan motor support		1
29	4518737		Step motor wire A		1
30	4518679		Step motor MP24GA-12V		2
32	4519900		Ionizer cable A		1
33	433134		Ionizer power		1
34	452867800	452867800R	Transformer		1
35	452939400		Electronic unit DC INV (version 5)	Replace by 467300026 from s'rial n°2253333288	1
36	452872800	4518663	Electrostatic filter		1
37	4526950		Wire cover		1
.	438082	231219	Battery probe length 320mm (black)		1
.	436673	900087	Infrared Remote control (RC4)	Without ioniser	1
.	453042500	453042500R	Infrared Remote control RC4-I-1	For ioniser	1
.	4519813		Room temperature probe (lg 320mmm)		1
36A	4519338		Filter frame		1
8A	4526951		Ionizer cover		1

13.3 Indoor Unit: FLO 12 DC INV R410A

Loc	Spare parts code	Replaced by	Description	Observation	Qty
1	4526941		Grill		1
2	452811300		Display assembly		1
3	4518655		Air filter		2
4	4519132		Active charcoal filter		1
5	4527029		Front panel		1
6	4526946		Lens (display)		1
7	4526952		Screw cover		2
8	433133		Ionizer		1
9	4526389		Evaporator		1
10	4518664		Condensate drain pipe		1
11	4518682		Gear box assy		1
12	4527434		Air diffuser assembly		1
14	4518638		Upper louver		1
15	4526953		Lower louver		1
19	4518662		Bearing assembly		1
20	4518661		Turbine D 91		1
21	4518730		Bottom		1
22	4518656		Mounting hook		2
23	4518657		Tubes lock		1
24	4518670		Wall suport		1
25	4518654		Pipes clamp		1
26	4519864	4519864R	Fan motor 900/800/700rpm		1
27	4518651		Motor flange		1
28	4518650		Fan motor support		1
29	4518737		Step motor wire A		1
30	4518679		Step motor MP24GA-12V		2
32	4519900		Ionizer cable A		1
33	433134		Ionizer power		1
34	452867800	452867800R	Transformer		1
35	452939400		Electronic unit DC INV (version 5)	Replace by 467300026 from srial n°2253333288	1
36	452872800	4518663	Electrostatic filter		1
37	4526950		Wire cover		1
.	438082	231219	Battery probe length 320mm (black)		1
.	436673	900087	Infrared Remote control (RC4)	Without ioniser	1
.	453042500	453042500R	Infrared Remote control RC4-I-1	For ioniser	1
.	4519813		Room temperature probe (lg 320mmm)		1
36A	4519338		Filter frame		1
8A	4526951		Ionizer cover		1

13.4 Outdoor Unit: GC 9 / 12 DC INV



13.5 Outdoor Unit: GC 9 DC INV

Loc	Spare parts code	Replaced by	Description	Observation	Qty
1	433218		Front panel		1
2	4526340		Baflfe		1
4	4526476		Propeller d=401mm		1
5	4527092		Fan motor		1
6	433215		Motor support		1
7	4523060		Bottom		1
9	4526403	4526403R	Outdoor controler		1
10	4524177		Gas valve 3/8 "		1
11	4524176		Liquid valve 1/4 "		1
12	4526224		EMI filter board		1
13	4526396	4526396R	Choke assy 167-021-01		1
14	4526223		AC-IN wire		1
15	4526968		Earthing wire with magnetic ring		1
16	4526222		Fuse connected wire		1
18	4526220		Fuse support JEF-511B		1
19	4526219	4526219R	Fuse 6C / 15A-230V		1
20	204107		Cable clamp		1
21	4519188		Terminal strip 4 terminals		1
22	433229		Valve cover		1
23	4526367		Reversing valve+tubing		1
24	4526221		Compressor wiring		1
25	4526204		Compressor Matsushita 5RS102XAB		1
26	4526775		Thermistor compressor		1
27	4526774		Outdoor air probe		1
28	4526776		Battery probe		1
29	4526969		Suction tube thermistor		1
30	452682802		Coil solenoid valve		1
31	4526827		Solenoid valve		1
32	4519606		RH panel		1
33	433228		Rear grill		1
34	4526368		Condenser		1
35	4526298		Leg motor support		1
36	4519614		Top panel		1
38	4519300		Propeller attachment Nut		1
39	433225		Handle		1
40	4519607		LH panel		1

13.6 Outdoor Unit: GC 12 DC INV

Loc	Spare parts code	Replaced by	Description	Observation	Qty
1	433218		Front panel		1
2	4526340		Baflfe		1
4	4526476		Propeller d=401mm		1
5	4527092		Fan motor		1
6	433215		Motor support		1
7	4523060		Bottom		1
9	4526403	4526403R	Outdoor controler		1
10	4524177		Gas valve 3/8 "		1
11	4524176		Liquid valve 1/4 "		1
12	4526224		EMI filter board		1
13	4526396	4526396R	Choke assy 167-021-01		1
14	4526223		AC-IN wire		1
15	4526968		Earthing wire with magnetic ring		1
16	4526222		Fuse connected wire		1
18	4526220		Fuse support JEF-511B		1
19	4526219	4526219R	Fuse 6C / 15A-230V		1
20	204107		Cable clamp		1
21	4519188		Terminal strip 4 terminals		1
22	433229		Valve cover		1
23	4526393		Reversing valve+tubing		1
24	4526221		Compressor wiring		1
25	4526204		Compressor Matsushita 5RS102XAB		1
26	4526775		Thermistor compressor		1
27	4526774		Outdoor air probe		1
28	4526776		Battery probe		1
29	4526969		Suction tube thermistor		1
30	452682802		Coil solenoid valve		1
31	4526827		Solenoid valve		1
32	4519606		RH panel		1
33	433228		Rear grill		1
34	4526368		Condenser		1
35	4526298		Leg motor support		1
36	4519614		Top panel		1
38	4519300		Propeller attachment Nut		1
39	433225		Handle		1
40	4519607		LH panel		1

CONTENTS

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- ► INSTALLATION MANUAL FLO 9 / 35 DCI
- ► OPERATING MANUAL FLO 9 / 35 DCI